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SYDENHAM AND LOCKE ON THE LIMITS OF ANATOMY

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The serious use of the microscope, lamented Robert Hooke in 1692, is "now reduced almost to a single votary, which is Mr. Leeuwenhoek; besides whom, I hear of none that make any other use of that instrument, but for diversion and pastime." [1] Singer has observed that the five great classical microscopists—Malpighi, Swammerdam, Hooke, Grew, Leeuwenhoek—" remained without effective followers until the nineteenth century. This is a remarkable fact and one that awaits adequate explanation." [2] The curious decline of significant microscopic inquiry during the eighteenth century has been noted repeatedly by historians of medicine and biology, and the frightful technical obstacles encountered by the early microscopists have been minutely recorded.[3] But there were diverse sorts of intellectual opposition which opposed the advance of microscopy beyond its brave beginnings even more effectively than technical obstacles. In the following essay I shall exhibit the objections to extensive anatomization present in the writings of Thomas Sydenham and John Locke, and indicate the divergence of their anatomical ideas from those of Francis

[1] R. T. Gunther, *Early Science in Oxford*, 14 vols., Oxford: Oxford Univ. Press, 1923-1945, vol. VII, 1930, p. 738.

[2] C. Singer, *A History of Biology*, London and New York: Aberlard-Schuman, 1959, p. 172.

[3] Cf. P. Harting, *Das Mikroskop*, Braunschweig: Vieweg, 1859; A. N. Disney (ed.), *Origin and Development of the Microscope*, London: Royal Microscopical Society, 1928.

Bacon, Robert Boyle, and Robert Hooke, attempting thereby to illuminate the intellectual opposition to microscopy during the last quarter of the seventeenth century in England. For this opposition must be carefully articulated before the subsequent history of biological microscopy can be understood, although this history will not be dealt with directly in this study.

It is in comparison with the conceptions of Bacon and Boyle that the notions of Sydenham and Locke on the proper limits of anatomy can be most advantageously displayed and the mentality of medical empiricism most fully understood.[4] The ideas and idioms of Bacon are continually apparent in the writings of Boyle, Sydenham, and Locke. Boyle's debt to Bacon is recorded in Boyle's claim that his natural philosophy is a continuation of Bacon's unfinished *Sylva Sylvarum*,[5] which was to muster for scientific induction all the reliable data of human experience. It is known that Bacon was one of Sydenham's three most beloved authors;[6] and *Methodus Curandi Febres* (1666), Sydenham's greatest work, was dedicated to Boyle, at whose behest he had written the book, and who had " gone so far as to accompany " Sydenham to his patients' bedsides.[7] It is doubtful, however, that Sydenham was ever a close friend or disciple of Boyle, as I shall indicate below; but it is certain that Dr. John Locke was intimate with both Boyle and Sydenham, those " master-builders " of his *Essay*.[8] Boyle even dedicated his *Memoirs for the Natural History of Humane Blood* (1684) to " the very ingenious and learned Dr. J. L."[9] But the usual obeisance of these men to Bacon's thought is punctuated, especially in the work of Sydenham and Locke, by remarkable departures from his formulations, amounting in the present case to a rejection of an instrument of inquiry which Bacon championed.

The rejection of microscopy by Sydenham and Locke is part of a strong

[4] For the historical and intellectual relationships of these men, cf. H. R. Fox Bourne, *The Life of John Locke*, 2 vols., London: King, 1876 (esp. vol. I, pp. 211-233, 403, 455); M. W. Cranston, *John Locke: A Biography*, New York: Macmillan, 1957, pp. 91-92; J. F. Payne, *Thomas Sydenham*, London: T. Fisher Unwin, 1900; J. Brown, "Locke and Sydenham," in *Horae subsecivae*, Edinburgh: Constable, 1858, pp. 3-98; P. Romanell, "Locke and Sydenham: A fragment on smallpox," *Bull. Hist. Med.*, 1958, *32*: 293-321.

[5] T. Birch (ed.), *The Works of the Honorable Robert Boyle*, 5 vols., London: Millar, 1744, vol. I, p. 196.

[6] Payne, *op. cit.*, pp. 231-232.

[7] R. G. Latham (trans. & ed.), *The Works of Thomas Sydenham*, M. D., 2 vols., London: The Sydenham Soc., 1848-1850, vol. I, p. 10.

[8] J. Locke, *An Essay Concerning Human Understanding*, A. C. Fraser (ed.), 2 vols., New York: Dover, 1959, "The Epistle to the Reader."

[9] Birch, *op. cit.*, vol. IV, p. 161.

empirical tradition in medicine dating at least from the Empiricist-Dogmatist controversy in Alexandria,[10] and still haunting medicine today.[11] For the reasons given by Locke and Sydenham in their rejection far transcend the rejection of a single instrument. They are rejecting an entire method, the way of anatomization and experimentation and discovery of the intimate material bases of disease, upon which so much of modern medicine is founded. Sydenham and Locke incarnate medical empiricism. To understand the grounds of their position is to gauge the mental distance separating clinical from experimental medicine, and to grasp some of the reasons which apparently led to the neglect of the microscope in the eighteenth century.

1. The Anatomization of Experience

Ars medica tota in observationibus: the art of medicine consists totally of observation. Laennec attributed his motto to Bacon and paid homage to Sydenham as a representative of its meaning, as did Cabanis, Pinel, and other members of the cult of observation in the Paris Clinical School.[12] The titulary god of medical observation is the divine old man of Cos, Hippocrates, "the Romulus of medicine" as Sydenham calls him. "He it is whom we can never duly praise. He it was who then laid the solid and immovable foundation for the whole superstructure of medicine . . . founded on the observation of the processes of Nature . . . It is the ruin of our prospects to have departed from our oldest and best guide, Hippocrates . . ." [13] Bacon also bemoans "the discontinuance of that useful method of Hippocrates, in writing narratives of particular cures with diligence and exactness . . ." [14] Although Bacon is far more critical of Hippocrates in *The Masculine Birth of Time*,[15] he usually praises him as the one who set human knowledge on the firm ground of experience, exemplifying "the regeneration of the sciences, by regularly raising them on the foundation of experience." [16] For Bacon's method was to "open and establish a new and certain course for the mind from the first actual perceptions of the senses themselves"; [17] knowledge must be gathered

[10] O. Temkin, "Celsus 'On Medicine' and the ancient medical sects," *Bull. Hist. Med.*, 1935, *3*: 249-264.
[11] F. Heilizer, *J. Chronic Dis.*, 1960, *11*: 102-148, *see* "Discussion" pp. 120-124.
[12] K. Faber, *Nosography*, 2nd ed., New York: Hoeber, 1930, chap. 2.
[13] Latham, *op. cit.*, vol. I, pp. 16, 18.
[14] *Advancement of Learning*, New York: Colonial Press, 1899, p. 114.
[15] B. Farrington, "Temporis partus masculus," *Centaurus*, 1951, *1*: 193.
[16] *Novum organum*, Bk. 1, Aphorism 97.
[17] *Ibid.*, Preface.

from experience and proved by works if " the monstrous altercations and barking questions " of the Schoolmen are to be avoided.[18] Received opinions, the hypotheses of the schools and thoughts of eminent authors, are anathemas to Sydenham and Locke as to Bacon and Boyle. From what source does the mind derive its materials of reason and knowledge, asks Locke. " To this I answer in one word, from EXPERIENCE. In that all our knowledge is founded; and from that it ultimately derives itself." [19] The conviction of Locke that nothing is in the mind which is not first in the senses entails a methodology, the " historical, plain method " of his *Essay*,[20] the triad of " experience, observation and natural history." [21] Locke's triad is emphatically asserted by Sydenham, who turns to " the careful observations of facts under the cognizance of our senses, and not to the flimsy fancies based upon the uncertain foundation of opinions." [22] In short, " we know what our five senses teach. . . . The whole philosophy of medicine consists in working out the histories of diseases, and applying the remedies which may dispel them; and Experience is the sole guide." [23] The idea of experience, however, is often the most elusive notion in a philosophy. Although Bacon, Boyle, Sydenham, and Locke all sought to derive knowledge from experience and apply knowledge to it, they so differ in their final interpretations of the scope of human observation that the latter pair of men come to maintain opposite views to the former concerning the role of instruments and experimentation in natural philosophy.

In the *Advancement of Learning* Bacon calls on men to examine nature at liberty, nature in her errors, and nature in constraint.[24] This triadic natural history corresponds to simple observation, the study of abnormalities to fathom the normal, and the use of active experimentation: ". . . there will be no inroad made into the secrets of nature unless experiments . . . are allowed for." [25] The Baconian indagator seeks principles which organize his natural knowledge and give power over his environment, trying " by every kind of experiment [to] elicit the discovery of causes and true axioms . . . Axioms, when rightly investigated and established . . . bring in their train whole troops of effects." [26] Mere empiricism, mere observation of nature at liberty, even if some classification of observations is introduced, is a barren method to Bacon because it rarely gives a fuller

[18] *Advancement*, p. 18.
[19] *Essay*, Bk. II, chap. 1, paragraph 2.
[20] *Ibid.*, Introduction, 2.
[21] *Ibid.*, IV, 12, 12.
[22] Latham, *op. cit.*, vol. II, p. 60.
[23] *Ibid.*, p. 182.
[24] *Advancement*, p. 46.
[25] *Ibid.*, p. 42.
[26] *Novum organum*, Bk. 1, Aphorism 70.

knowledge or more power to alter nature. "The art of medicine, without the assistance of natural philosophy, differs but little from empiricism." [27] Medicine must include active experimentation as well as passive observation, no matter how astute, in order to achieve the "true axioms" which reflect causes and and thereby give the most powerful sort of understanding. "We have good reason . . . to derive hope from a closer and purer alliance of these faculties (the experimental and rational) than has yet been attempted." [28] Bacon's advanced vision of the mutually informing interplay of reason with experiment, although it remained rather inchoate, and although it had been as fully stated by Grosseteste in the twelfth century [29] and by the Aristotelian thinkers in Padua during the sixteenth,[30] was the most influential source of scientific methodology and apologetics in the time of Sydenham and Locke.

Robert Boyle warmly advocates the great instauration, following in general "the illustrious Lord *Verulam* (one of the most judicious naturalists, that our age can boast)." [31] Boyle's idea of natural history, like Bacon's, encompasses both observation and experimentation: ". . . attention alone might quickly furnish us with one half of the history of nature," writes Boyle in his *Physiological Essays* (1661), "as well as industry is requisite, by new experiments, to enrich us with the other." [32] Boyle too is searching for the "real history" [33] which will yield "true axioms," and nature must be dissected, experiments performed, to obtain this end. There are, says Boyle, "two very distinct ends, that men propound to themselves in studying natural philosophy. For some men care only to know nature, others desire to command her." [34] Nature can be abstractly 'known,' certain events can be plausibly 'explained' by the speculative physics of Hobbes, Gassendi, or Descartes; but to Boyle such knowledge is effete, without command over nature; it covers all possible events but touches none, for it does not generate statements which bear immediately upon specific natural processes in such a way as to give men power to intervene in them intelligently. Boyle wholly assents to

[27] *Advancement*, p. 106; *see* also p. 113.
[28] *Novum organum*, Bk. 1, Aphorism 95.
[29] A. C. Crombie, *Robert Grosseteste and the Origins of Experimental Science, 1100-1700*, Oxford: Clarendon Press, 1953.
[30] J. H. Randall, Jr., "The development of scientific method in the School of Padua," *J. Hist. of Ideas*, 1940, *1*: 177-206.
[31] Birch, *op. cit.*, vol. I, p. 581.
[32] *Ibid.*, p. 196.
[33] *Novum organum*, Bk. 1, Aphorism 62.
[34] Birch, *op. cit.*, vol. I, p. 196.

Bacon's program of "founding a real model of the world in the understanding, such as it is found to be, not such as man's reason has distorted. Now this cannot be done without *dissecting and anatomizing the world* . . ." [35]

'Dissection' and 'anatomization' as used by Bacon and Boyle are synonyms for 'experimental analysis'; indeed, 'anatomy' and 'analysis' share a similar etymology.[36] Progressive anatomization—of ideas, of nature quick and dead, using every available tool of mind and hand—is the essence of Baconian natural philosophy, the philosophy he hoped would guide medicine between the irrelevance of dogmatic rationalism and the inanity of thoughtless empiricism. Bacon's distinction between gross and microscopic anatomy occurs in *Novum organum*:

> Labor is well and usefully bestowed upon the anatomy of organized bodies, such as those of men and animals . . . [This] species of anatomy, however, is that of first sight, open to the senses . . . It is obvious, and of ready access, when compared with the real anatomy of latent conformation in bodies . . .[37]

Bacon draws a basic distinction between the anatomy of "first sight," grossly visible to the unaided eye, and the "real anatomy of latent conformation," the anatomy of the radical texture of living organisms beyond the reach of unaided vision. To investigate this "real anatomy" requires special instrumentation which extends the range of human perception, whereas gross anatomy is "obvious, and of ready access." Bacon also distinguishes between simple and comparative anatomy. He remarks that "simple anatomy has been fully and clearly handled, yet comparative anatomy is deficient. For anatomists have carefully examined into all the parts . . . but pass over the different figure and state of those parts in different persons." [38] Bacon's simple anatomy differs from his comparative anatomy in that the former is based upon several dissections, the latter upon many. "Comparative anatomy" was first given its modern meaning by Nehemiah Grew in his *Comparative Anatomy of Stomachs and Guts Begun* (1676); but Bacon in his earlier conception of simple and comparative anatomy is calling for a gross anatomy which includes individual variation within one species. Boyle was more familiar with gross anatomy than Bacon. In *The Usefulness of Experimental Philosophy* (1663), Boyle confesses that he "could with more delight look

[35] *Novum organum*, Bk. 1, Aphorism 124, italics added.
[36] H. S. Bennett, "The role of histology in medical education and biological thinking," *Anat. Rec.*, 1956, *125*: 327-354.
[37] *Novum organum*, Bk. 2, Aphorism 7.
[38] *Advancement*, p. 115.

upon a skilful dissection, than upon the famous clock at Strasburgh." [39] Elsewhere he praises "that exquisite structure of the bodies of dead animals, that is discernible by the knives of the anatomists." [40] Comparative anatomy, in the modern meaning of Grew, is of utmost importance for Boyle because it can "inform physicians of the true use of the parts of an human body, and help decide divers anatomical controversies." For

> of divers parts of an human body it is very difficult to learn the true use, without consulting the bodies of other animals, wherein the part inquired after is by nature either wholly left out as needless, or wherein its differing bigness, or situation, or figure, or connection with, and relation to other parts, may render its use more conspicuous, or at least, more discernible.[41]

Ultimately Bacon's "comparative anatomy" amounts to an early manifesto of pathological anatomy. It is a "rigorous knowledge, to be acquired only by silent and long experience," and is concerned with individual differences in internal parts. "And in these differences of the internal parts are often found the immediate causes of many diseases, which physicians not observing, sometimes unjustly accuse the humors, when the fault lies only in the mechanic structure of a part." These anatomical alterations in disease are not limited to mechanical obstructions and other 'surgical' diseases; they include 'medical' ills as well. "So the marks and impressions of diseases, and the changes and devastations they bring upon the internal parts, are to be diligently observed in different dissections . . ." [42] The pathological processes such anatomy illuminates are the proximate causes of disease. Bacon's comparative anatomy remains a gross anatomy of 'first sight,' not a 'real anatomy of latent conformation' which would seek the ultimate material alterations in disease.

Boyle agrees with Bacon that morbid anatomy is necessary to advance medicine beyond mere empiricism. Boyle asks if "it would be worth an impartial disquisition, whether, since the *methodus medendi* ought to be grounded on . . . the doctrine of diseases, the new anatomical discoveries . . . do not, by innovating divers things in pathology, require some alterations and amendments in the *methodus medendi*"; [43] but he leaves the answer to professional physicians. Increased interest in the dissection of sound and diseased animals and of "the bodies of men killed by diseases" has advanced "the doctrine of the causes and seats of diseases," wrote

[39] Birch, *op. cit.*, vol. I, p. 424.
[40] *Ibid.*, vol. IV, p. 540.
[41] *Ibid.*, vol. I, p. 466.
[42] *Advancement*, pp. 115-116.
[43] Birch, *op. cit.*, vol. I, p. 523.

Boyle a century before Morgagni. The "improvement of physick," he continued, "may . . . be ascribed to [the] industrious scrutiny of the seat and effects of the peccant matter of diseases in the bodies of those that have been destroyed by them." [44] And Boyle correlated postmortem findings with the signs and symptoms observed during the patient's life.[45] Walter Charleton, a prominent physician and anatomist of Sydenham's day, agreed with Boyle that only after an advance in "this useful art of anatomy" would "the Pathologic part of medicine by degrees [be] rais'd from the darkness of uncertain conjectures, to the light of sensible demonstrations" so that "the infirmities of mens bodies may at length be more certainly and easily cured." [46] Many similar programmatic statements urging the development of pathological anatomy can be culled from the works of seventeenth and eighteenth century physicians. They form part of the tradition of pathology which includes the *Observationes anatomicae* (1658) of Wepfer, the *Sepulchretum* (1679) of Bonet, and the monumental *De sedibus et causis morborum* (1761) of Morgagni, and which issues in the methodology of clinical-pathological correlation in the Paris School.[47]

Sydenham and Locke, however, have no worthwhile conception of comparative anatomy and only grudgingly ascribe any importance at all to gross anatomy. Sydenham's essay "On Dropsy" (1683) contains his most detailed consideration of the uses of anatomy:

> . . . it is very necessary for a physician to know well and thoroughly the structure of the human body; so that he form true ideas concerning Nature, and concerning the causes of certain diseases. How can one who knows not the structure of the kidneys, and the ducts that lead from them to the bladder, see his way to those symptoms which arise from a calculus; . . . So necessary is this knowledge, that he who wants it is like a man fighting blindfold . . . It may be learned well and thoroughly by dissection . . . and that easily, and by men whose wit is limited.[48]

The physician, argue Sydenham and Locke, requires only a general knowledge of Bacon's anatomy of first sight. Locke, in his fragment *Anatomie* (1668), remarks:

> And he that has but anatomy enough to know a vein and skill enough to use a

[44] *Ibid.*, pp. 476-477.
[45] *Ibid.*, p. 480.
[46] W. Charleton, *Enquiries into Human Nature in VI. Anatomic Praelections*, London: Boulton, 1680, Preface.
[47] Cf. P. Cabanis, *Sketch of the Revolutions of Medical Science*, A. Henderson (trans.), London: J Johnson, 1806, p. 294.
[48] Latham, *op. cit.*, vol. II, pp. 170-171.

lancet . . . has . . . more information from the bloud and light into the disease than ever he could gain by ripping up all the veins and arteries tracing their branches and meanders in ever soe many dead carcasses.[49]

The physician should not waste his time acquiring a knowledge of gross anatomy beyond that minimal amount necessary for intelligent practice. Instead of dissecting extensively, writes Sydenham, men "should rather promote the art of medicine by diligent observation of natural phenomena."[50] A well-worn anecdote reflects this practical emphasis of Sydenham. Hans Sloane arrived to study physic with Sydenham, bearing an introduction as a "ripe scholar, a good botanist, and skillful anatomist." Sydenham retorted: "This is all very fine, but it won't do—Anatomy—Botany, Nonsense! Sir, I know an old woman in Covent Garden who understands Botany better, and as for Anatomy, my butcher can dissect a joint full as well; no, young man, all this is stuff: you must go to the bedside, it is there alone you can learn disease."[51] And in the margin of another medical fragment of Locke's, *De arte medica* (1669), Sydenham scribbled: "Others of them have more pompously and speciously prosecuted the promoting of this art by searching into the bowels of dead and living creatures, as well sound as diseased, to find out the seeds of discharging them, but with how little success such endeavours have been and are like to attend, I shall here in some measure make appear."[52] Elsewhere, however, Sydenham casually refers to postmortem confirmation of his clinical impressions[53] and invokes hypothetical anatomical alterations to account for certain symptoms and signs.[54] Further evidence of a latent localizing attitude towards disease is contained in such phrases as "the true seat of the disease" which one encounters in Sydenham's work.[55] It remains true, nevertheless, that only rudimentary gross anatomy is necessary for Sydenham's practitioner. Physic advances along the threefold path of more perfect natural histories of disease entities, improvement of the *methodus medendi* by sedulous observation, and the empirical discovery of specific pharmacological remedies like the Peruvian bark (quinine).[56] Anatomy does not contribute to the advance of medicine.

Sydenham and Locke abhor burdening medical practice with any knowl-

[49] K. Dewhurst, "Locke and Sydenham on the teaching of anatomy," *Medical History*, 1958, *2*: 1-12, reprints original text of Locke's *Anatomie*.
[50] Latham, *op. cit.*, vol. II, p. 171.
[51] Payne, *op. cit.*, p. 190.
[52] Fox Bourne, *op. cit.*, vol. I, p. 228.
[53] Latham, *op. cit.*, vol. II, pp. 96, 180.
[54] *Ibid.*, vol. I, p. 226.
[55] *Ibid.*, vol. II, p. 126.
[56] *Ibid.*, vol. I, pp. 11-24.

edge that is not immediately useful in therapy or prognosis. The physician is always ignorant of the cause of diseases, usually of their proper treatment, and often of their natural history; and yet the doctor must act *now*. "A murderous array of disease has to be fought against, and the battle is not a battle for the sluggard. Day by day there is the combat against the life of man, and there is neither truce nor quarter." [57] Medicine is a desperate business dealing in human life, argue Sydenham and Locke; it has no place for nice speculations on disease mechanisms or for experimental analysis unrelated to present clinical demands. "Genuine practice" rather than a search for material causes is the obligation of the doctor, whose "province is to cure disease, and to do naught else. Wise and learned, then, as he may be, he will do no real good in medicine, who, instead of investigating the . . . methods whereby Nature evolves disease, instead of studying their history, and instead of putting forth his whole strength to the adaptation of remedies, wearies his brain with curious and irrelevant speculations; speculations which, for the proper undertaking of medicine, the saving of men from death are not one iota of value." [58] These words are more than an argument from necessity. They display a religious intensity, a fierce Puritanical zeal bent on attaining useful knowledge and doing good works. The pervasive influence of the Calvinistic temper on the growth of scientific thought in seventeenth century England has been studied thoroughly; [59] and this bias is constantly evident in Sydenham's work, especially in his rejection of microscopic anatomization.

The utilitarian argument against basic research has been answered many times, even by the Bacon Sydenham esteemed. "But our hope of further progress in the sciences will then only be well founded," writes Bacon in *Novum organum*, "when numerous experiments shall be received and collected into natural history, which *though of no use in themselves*, assist materially in the discovery of causes and axioms; which experiments we have termed enlightening, to distinguish them from those which are profitable." [60] Shortly after Sydenham's death he was criticized by James Keill for rejecting all "Knowledge of the Animal Oeconomy,

[57] *Ibid.*, pp. 267-268.

[58] *Ibid.*, vol. II, pp. 83-84.

[59] Cf. D. Stimson, "Puritanism and the New Philosophy in seventeenth century England," *Bull. Hist. Med.*, 1935, *3*: 321-334; R. K. Merton, "Science, technology and society in seventeenth century England," *Osiris*, 1938, *4*: 360-632; R. S. Westfall, *Science and Religion in Seventeenth Century England*, New Haven: Yale Univ. Press, 1959.

[60] Bk. 1, Aphorism 99, italics added.

because there is nothing certain in this Science besides some Generals; that Nature is incomprehensible; and that the Explications which the most Ingenious have made of the Animal Oeconomy, are mere Figments of the Brain . . . This sort of Discourse is the Refuge of Idleness and Ignorance." [61] And Niels Stensen was addressing Sydenham's ilk when he attacked the utilitarian objection to limitless anatomization:

> They are all looking for remedies, but few take the trouble to learn to know the finer structure of the part of the body they wish to treat. . . . And as thus the science . . . embodies much which we do not know but can learn to know, and as such knowledge is important not only from a theoretic point of view but also for the sake of good health, each one may decide whether our judges are justified in laughing at the investigation of the anatomists and asserting that it is merely the pastime of the unconcerned.[62]

It seems that the utilitarian objection to protracted inquiry into the complex, hidden material bases of biological phenomena, the conflict between the urgency of treatment and the leisure of analysis, has to be answered freshly for each generation of investigators.

Sydenham's gross anatomy, Locke's surgical anatomy, and Gideon Harvey's "necessary and competent" anatomy [63] are all anatomies built for action; they can direct the knife and account for some glaring signs and symptoms, but never incorporate knowledge which is not immediately useful in medical practice. Experience must not be anatomized beyond the obvious. *Ars medica tota in observationibus.* But the more extreme sceptical notions of Locke and Sydenham emerge most clearly in their rejection of miscroscopic anatomy, the quest for the ultimate material bases of disease.

2. The Sceptical Physitian

The ideas of Sydenham and Locke on observation, classification, and explanation differ from those of Bacon and Boyle and entail a general rejection of experimental biological inquiry, especially of anatomization with instruments. For Bacon and Boyle natural history is the fount of effective knowledge, "a collection of materials for a just and solid induction, whereon philosophy is to be grounded." [64] Natural history, by means

[61] *Essays on Several Parts of the Animal Oeconomy*, 4th ed., London: G. Strahan, 1738, p. xxii.

[62] Quoted in E. Bastholm, *The History of Muscle Physiology, Acta historica scientiarum naturalium et medicinalium*, vol. VII, Copenhagen: Munksgaard, 1950, p. 159.

[63] G. Harvey, *The Conclave of Physicians*, 2nd ed., London: J. Partridge, 1686, p. 23.

[64] *Advancement*, pp. 49-50.

of observation and classification and experimentation, must " effect a complete solution and separation of nature." [65] Such an anatomization of nature results in a knowledge of forms or laws,[66] and specific consequences can be deduced from true forms or axioms.[67] Or, as Boyle puts it, " to render a reason of an effect or phenomenon, is to deduce it from something else in nature more known than itself." [68] Forms as laws reside in the human mind but correspond to real communities of natural things, real divisions, classes, or species.[69] The form which constitutes a real genus in nature plunges beneath superficies to " stir the limits of things " and classify events and things in a scientifically significant fashion: ". . . he who is acquainted with forms, comprehends the unity of nature in substances apparently most distinct from each other." [70] Bacon distinguishes between several sorts of classification and in so doing diverges from the classificatory method of Sydenham and Locke.

> . . . since the real forms . . . lie at some depth, and are not easily discovered, the necessity of the case and the infirmity of the human understanding require that the particular forms, which collect certain groups of instances . . . into some common notion, should not be neglected, but most diligently observed. For whatever unites nature, even imperfectly, opens the way to the discovery of the form.[71]

Classifications based on observation of external resemblances are points of departure in the search for the real internal forms, preliminary maps which assist the human understanding in the experimental discovery of more fundamental material relations. Bacon's preliminary classifications are the gross anatomy of nature, the forms or laws of the immediate causes of observed phenomena. Sydenham and Locke concur with Bacon only so far. Their classifications are confined to the surfaces far from the ultimate material ground of things, far from the " real anatomy of latent conformation." And they sceptically reject the possibility of ever achieving knowledge of real internal forms, neglecting Bacon's admonition that the investigator progress beyond external classification to " actually penetrate nature, and discover the properties and effects of bodies, and the determinate laws of their substance." [72]

Scholars agree that systematic nosology, the classification of diseases into definite clinical species, begins with the efforts of Sydenham.[73] In-

[65] *Novum organum*, Bk. 2, Aphorism 16.
[66] *Ibid.*, Aphorism 2.
[67] *Ibid.*, Aphorism 4.
[68] Birch, *op. cit.*, vol. I, p. 198.
[69] *Novum organum*, Bk. 2, Aphorism 4.
[70] *Ibid.*, Aphorism 3.
[71] *Ibid.*, Aphorism 26.
[72] *Ibid.*, Aphorism 52.
[73] Faber, *op. cit.*, chap. 1.

stead of dealing with diseases in individual patients as Hippocrates had done, Sydenham's natural history seeks by acute observation to delineate *species* of disease, akin to the method of the seventeenth century botanists.[74] " It is necessary," writes Sydenham, " that all diseases be reduced to definite and certain species, and that, with the same care which we see exhibited by botanists in their phytologies . . ." [75] Of a quartan ague Sydenham finds " reasons for believing that this disease is a species equally cogent with those that we have for believing a plant to be a species." [76] Sydenham knew something of current phytology, for he elsewhere refers to the " Catalogue of English Plants " of " that most excellent botanist Mr. Ray." [77] But there is no evidence that Sydenham studied the more methodological works of the botanists.

Sydenham confidently asserts that he can observe real and genuine phenomena (disease species) without presuppositions, and that such phenomena unequivocally define a species. But other taxonomists of the seventeenth and eighteenth centuries, in botany and zoology as well as in nosology, were more critical of the reality of species [78] and were less inclined to think that they could observe without presuppositions. As Boyle puts it, " such an absolute suspension of the exercise of reasoning were exceeding troublesome, if not impossible." [79] Locke also has his doubts. Although he greatly admires Sydenham's " way of accurate practical observation " and generally accepts the existence of " distinct species of diseases," Locke nevertheless questions the real existence of species in nature and is led by the logic of his dualistic epistemology towards a pervasive scepticism.

Locke doubts the reality of species for two reasons. One is his belief that nature is continuous, for " in all the visible corporeal world, we see no chasms or gaps. All quite down from us the descent is by easy steps, and a continual series of things, that in each remove differ very little one from the other. . . . the several species are linked together, and differ but in almost insensible degrees." [80] This argument against the reality of

[74] O. Temkin, " Die Krankheitsauffassung von Hippokrates und Sydenham in ihren 'Epidemien,' " *Sudhoff's Arch. f. Gesch. d. Med. u. d. Naturwissensch.*, 1928, *20*: 327-352.
[75] Latham, *op. cit.*, vol. I, p. 13.
[76] *Ibid.*, pp. 19-20.
[77] *Ibid.*, vol. II, p. 222.
[78] Cf. A. Lovejoy, *The Great Chain of Being*, Cambridge, Mass.: Harvard Univ. Press, 1936, chap. 8 & *passim*; also " Buffon and the problem of species," in *Forerunners of Darwin 1745-1859*, B. Glass, O. Temkin, W. Straus, Jr., (eds.), Baltimore: Johns Hopkins Press, 1959, pp. 84-113.
[79] Birch, *op. cit.*, vol. I, p. 194.
[80] *Essay*, III, 6, 12.

species, based upon a belief in a great chain of being and in the related conceptions of continuity and plenitude in nature, was powerful and widespread in Locke's day.[81] But his belief in a continuous chain of natural beings, important as it is in his doubts on the reality of species, is not a part of the logical fabric of Locke's *Essay*, and therefore sheds little light on his reasons for denying that men can have knowledge of natural substances or essences. The latter denial is his second reason for doubting the reality of species, and, by implication, the reality of species of disease. Locke's epistemology involves a sceptical refutation of Sydenham's belief that the observer can escape from presuppositions and observe the " real and genuine " [82] phenomena which define disease entities.

The Aristotelean definition of species in terms of essences, as developed in Scholastic thought, persisted in the biology and medicine of Locke's time. In the course of his argument that the forms of the Scholastics are unknowable, Locke draws his famous distinction between real and nominal essences. " The measure and boundary of each sort or species, whereby it is constituted that particular sort, and distinguished from others is that we call its *essence*, which is nothing but that abstract idea to which the name is annexed; so that everything contained in that idea is essential to that sort." The latter is " the *nominal essence*, to distinguish it from the real constitution of substances, upon which depends this nominal essence, and all the properties of that sort; which . . . may be called the *real essence* . . . the constitution of the insensible parts of that body." [83] Against the Scholastics Locke argues that it is impossible to " rank and sort things . . . by their real essences; because we know them not. Our faculties carry us no further towards the knowledge and distinction of substances, than a collection of those sensible ideas which we observe in them; which . . . [are] remote from the true internal constitution from which those qualities flow," utterly removed from " the fine contrivances and inconceivable real essences of plants and animals," [84] from Bacon's " real anatomy of latent conformation."

Locke's curious argument amounts to rejecting real essences and having them too. For on the one hand, nominal essences wholly " depend on such collection of ideas as men have made, and not on the real nature of things "; [85] and as mere mental realities are entirely " remote from the true internal constitution " of things. But on the other hand, nominal essence reliably " depends upon " real essence: ". . . it is past doubt there

[81] Lovejoy, *The Great Chain of Being*, p. 145.
[82] Latham, *op. cit.*, vol. I, p. 129.
[83] *Essay*, III, 6, 12.
[84] *Ibid.*, III, 6, 9.
[85] *Ibid.*, III, 6, 1.

must be some real constitution, on which any collection of simple ideas coexisting must depend." [86] There is, however, no logical necessity in the argument of Locke's *Essay* why such a guarantee should obtain, and every reason why it should not. The rejection of a knowledge of real essences follows from Locke's epistemological premises; but the assertion that nominal essences depend upon a real constitution in any constant way is not a logical consequence of his argument. In his anxiety to deny any knowledge of the occult substantial forms of the Scholastics, Locke involves himself in a scepticism which weakens the foundation of human knowledge in experience.[87] Locke's guarantees of the reality of human knowledge, of "the conformity between our ideas and the reality of things," [88] are not derivable from the statements in his epistemological analysis. They are gratuitous assertions, unargued assumptions, leaps of faith; for ultimately it is God who guarantees that ideas conform with "the reality of things." [89]

The other guarantee of knowledge is Locke's physical hypothesis of perception, which he adumbrates in terms of Boyle's corpuscularian philosophy.[90] Simple ideas occurring in the mind reflect a causal process involving a chain of material corpuscles initially set into motion by "real constitutions" in the natural world. This easily picturable model of sensation in the *Essay* lends plausibility to Locke's claim that human knowledge is real, even though his analysis sunders knowledge from the real essences of things and thereby gravitates towards scepticism. Sydenham never doubted that untrammeled observation would yield a knowledge of real species of disease. But Locke's analysis of classification in terms of real and nominal essences demonstrates a logical abyss separating human knowledge of species from whatever their unknown natural constitution may be, and thereby questions the very possibility of significant scientific classification, whether of animals, plants, or diseases. "This consideration alone is enough to put an end to all our hopes of ever having the ideas of their real essences; which whilst we want, the nominal essences we make use of instead of them will be able to furnish us but very sparingly with any general knowledge, or universal propositions capable of real certainty." [91]

[86] *Ibid.*, III, 3, 15.
[87] Cf. A. Hofstadter, *Locke and Scepticism*, New York: Albee Press, 1935.
[88] *Essay*, IV, 4, 3.
[89] *Ibid.*
[90] Cf. F. H. Anderson, *The Influence of Contemporary Science on Locke's Method and Results*, Toronto: The University Library, 1923.
[91] *Essay*, IV, 6, 12; Romanell, *op. cit.*, p. 304.

Locke and Sydenham fully concur, however, in limiting the phenomena which define their species to those which are available to sensation unaided by instruments. Their species are preliminary classifications, in Bacon's sense, which haunt the surfaces of things far distant from the real anatomy of latent conformation, the texture of molecular events. Their classifications are gross, molar, phenomenological; they refuse to stir the limits of things by inclining the logic of their inquiry toward the future discovery of minute entities and events underlying the gross phenomena. But Boyle displays an explicit comprehension of explanatory levels and of reductive possibilities in science. He maintains that explanations using molecular terms—" the primitive and catholick affections of matter, namely, bulk, shape and motion "—are more satisfactory, instructing, and gratifying than explanations which deduce phenomena from statements containing molar terms, " the more obvious and familiar qualities or states of bodies." [92] Preliminary classifications or molar laws, argues Boyle, are important steps in the scientific interpretation of nature; but these " first vintages " of Bacon should be regarded as heuristic departures in the search for the more minute anatomies of things. Boyle was of unparalleled importance in establishing the experimental philosophy in England.[93] His sophisticated ideas on alternative explanations and on the necessity of establishing *both* the molecular laws of matter and the phenomenological generalizations of the kind used by Sydenham and Locke were not appreciated by these two men who praised the thought of Boyle so highly.

The Sceptical Physitian, however, was far more sceptical than the Sceptical Chemist. For Sydenham and Locke not only failed to appreciate the admonitions of Bacon and Boyle to profoundly anatomize nature and establish the microscopic laws which can deduce macroscopic events; they even denied that such laws could *ever* be achieved, or that it was necessary to achieve them. The rejection of anatomization by Sydenham and Locke rests upon four main objections—polemical, utilitarian, ethical, and epistemological objections. Their polemical objection to extensive anatomization is the common concern of Locke and Sydenham to eschew " that romance way of physick " based upon

> the Galenists four humors, or the chymists sal, sulphur and mercury, or the late prevailing invention of acid and alcali, or whatever hereafter shall be substituted to these with new applause, . . . [are] but so many learned empty sounds, with

[92] Birch, *op. cit.*, vol. I, p. 198.

[93] Cf. M. Boas, " The establishment of the mechanical philosophy," *Osiris*, 1952, *10*: 412-541.

no precise determinate signification. What we know of the works of nature . . . is only by the sensible effect, but not by any certainty we can have of the tools she uses, or the way she works by. So there is nothing left for a physician to do, but observe well.[94]

It is extremely important to appreciate the polemical context of the rejection of anatomization by Locke and Sydenham. "The learned men of former ages," Locke writes in *De arte medica*, "employed a great part of their time and thoughts searching out the hidden causes of distemper, were curious in imagining the secret workmanship of nature and . . . putting all these fancies together, fashioned themselves systems and hypotheses" which have "diverted their enquiries from the true knowledge of things." Locke and Sydenham vehemently reject this method; but the terms of their rejection, we shall see, led to unfortunate conclusions.

The full import of their utilitarian objection is seen best in connection with the ethical objections Sydenham and Locke raise to the augmentation of human experience beyond the domain of common sense, the realm accessible to the naked eye and the unassisted hand. Observation *without* instruments is a moral imperative for Sydenham and Locke, as is observation *with* instruments for Bacon and Boyle. Anatomization beyond what is obvious at first sight requires instrumental aids, as well as a faith that nature is knowable in its more minute motions. On both accounts anatomization is rejected by our sceptical physicians.

. . . the investigation and illustration of primary and ultimate causes is a neglect of our capabilities, and a violation of nature. Hand in hand with this is the contempt for those causes that ought to be, and which can be understood; which lie before our feet; . . . which are revealed by either the testimony of our senses, or by anatomical observations of long standing. . . . As it is clearly impossible that a physician should discover those causes of disease that are not cognisable by the senses, so also it is unnecessary that he should attempt it. It is quite sufficient for him to know whence the mischief immediately arises . . .[95]

The passion, morality, and ambiguity of this quote from Sydenham are remarkable. Serious ambiguity arises from his failure to distinguish between "primary and ultimate causes" in the sense of occult forms or forces and in the sense of the Experimental Philosophers. The burden of Sydenham's work argues that he did not wish to make the distinction, that he fully intended to reject the anatomizing way of the Royal Society

[94] Locke to Dr. Molyneux, 20 Jan. 1693; in *Some Familiar Letters between Mr. Locke and Several of his Friends*, London, 1708, p. 284.

[95] Latham, *op. cit.*, vol. I, p. 20. For discussion of Sydenham's conception of causality, *see* R. M. Yost, Jr., "Sydenham's philosophy of science," *Osiris*, 1950, *9*: 84-105.

and Royal College of Physicians as a barren quest after causes which are as useless and as unknowable as the hidden causes of the Scholastic way. More intriguing, however, is Sydenham's unargued denial that observation can be quantitatively refined and extended by instruments without being qualitatively transformed into an impossible knowledge of occult forms. There is a passionate Puritanical morality reflected in such a denial and in the phrases " a violation of nature " and " contempt for those causes that *ought* to be . . . understood." One of the two most important reasons for Sydenham's uncompromising rejection of anatomization is displayed in this extraordinary passage:

> . . . however much, by seriously inclining our minds, we may discover what Nature does, and by what organs she does it, the way in which she does it will *always be unknown to man*. No wonder. It is infinitely more credible that we, miserable beings, wanderers from the bright path of knowledge, should be incapable of comprehending the method of the Supreme Artificer in his wondrous and wise machinery, than that a coarse smith should be but a rude admirer of the exquisitely elegant workmanship of a watch.[96]

In interpreting Sydenham's influential medical philosophy it should not be forgotten that he is the Puritanical author of *Theologia rationalis*. There he repeats that science cannot lead " us up into the causes and efficiencies " because it can show " onely things, as they consist in matter of fact." [97] " All our knowledge . . . is gross and rough, dealing only with the outer husk of things that we would know," [98] because man has " his intellectual faculties shaped by Nature, as to be enabled to perceive not what is absolute truth, but only that which is necessary for him to know, and fitted to his nature." [99] It is the physician's *duty* to confine his observations to the " outer husk of things," for God has shaped his faculties to perceive only the superficies of bodies, not the minute processes in nature's " abyss of cause "; [100] and to attempt to transcend the ordained sphere of perception by microscopic anatomization is to sin against God. It is our moral duty to refrain from anatomizing with instruments.

There is, moreover, an unknowable divine essence at the base of most diseases, " some specific property which no speculations deduced from the contemplation of the human frame will ever be enabled to discover and exhibit." [101] Sydenham's humoral theory of disease asserts the very sort of occult causal entities he so violently rejects and is the other important reason for his damnation of microscopy.

[96] Latham, *op. cit.*, vol. II, p. 84, italics added.
[97] *Ibid.*, p. 319.
[98] *Ibid.*, p. 171.
[99] *Ibid.*, p. 212.
[100] *Ibid.*, vol. I, p. 102.
[101] *Ibid.*, vol. II, p. 171.

> By diligent research during dissections, and by careful scrutiny, we may attain to the knowledge of those larger organs by which Nature conducts her more visible operations. . . . *What, however, neither human eye will see, nor microscope disclose*, is the origin and primary cause of such movements. What microscope, however exquisitely elaborate, shall make visible those minute pores by which . . . the chyle passes from the intestines to the chyliferous vessels? Or what microscope shall exhibit those ducts through which the blood, conducted by the arteries, is passed onwards to the orifices of the veins? [102]

Sydenham asked these questions two decades after Malpighi had described capillaries with his microscope, an observation of such theoretical importance that it alone might have insured the continued use of that instrument in biological investigation, in the absence of intellectual resistance. It took an electron microscope to "make visible those minute pores by which . . . the chyle passes from the intestines to the chyliferous vessels"; [103] but Sydenham's ignorance of the great observation of Malpighi symbolizes his general ignorance of the experimental activities of the Royal Society and Royal College of Physicians, further emphasizing his mental distance from Boyle. The prolix Dr. Stubbe—a doughty opponent of experimental philosophy, supposedly employed by a jealous Fellow of the Royal College of Physicians to write his entertaining polemics against the Royal Society [104]—wrote to Boyle that "except it be Dr. Sydenham and the young Coxe, I believe that not one [physician] lives that doth not condemn your experimental philosophy." [105] In spite of Stubbe's identification of Sydenham as a defender of the experimental philosophy, there is very little evidence that he fully understood, or cared to understand, Boyle's corpuscularian philosophy with its emphasis on instrumentation and many-leveled explanation. Boyle the conquerer of occult forms, and Boyle the chemist-botanist in search of specifics against diseases, were the aspects of Boyle which attracted Sydenham. His most generous reference to the experimentalists occurs in a passage where he speaks of "those who, in our own time, and in our own island, have done good work in each kind of science that advances medicine." [106] Sydenham's indirect contact with the Royal Society and Royal College of Physicians through Boyle, Mapletoft, Goodall, and Micklethwaite remains to be clarified; but he cer-

[102] *Ibid.*, italics added.

[103] Cf. S. L. Palay, L. J. Karlin, "An electron microscopic study of the intestinal villus. II. The pathway of fat absorption," *J. Biophys. Biochem. Cyt.*, 1959, *5*: 373-384.

[104] H. Brown, *Scientific Organisations in Seventeenth Century France*, Baltimore: Williams and Wilkins, 1934, pp. 256-257.

[105] Stubbe to Boyle, 4 June 1670; Quoted in D. Stimson, "The critical years of the Royal Society," *J. Hist. Med. & Allied Sc.*, 1947, *2*: 283-298, p. 290.

[106] Latham, *op. cit.*, vol. I, p. 11.

tainly was not one of the Virtuosi. The ubiquitous Hooke noted in his *Diary* for Tuesday, June 8, 1675: "Rode to Acton with Dr. Siddenham, did me good, he invited me to stay with him six weeks. Told me of his book. Discoursd with me of Physick, religion, philosophy . . ." [107] And on August 31st: "At Dr. Sydenham. Confounded his novice metaphysica. Walked with him." [108] Robert Hooke, who was probably the most imaginative experimental scientist and leading microscopist in England, walked with Thomas Sydenham, an opponent of microscopy and experimental philosophy, when each was in the maturity of his thought. But their words are lost forever. One ironic fact remains: Sydenham praises the thought of Bacon and Boyle but rejects their anatomizing methods of inquiry.

Locke shares with Sydenham the polemical, utilitarian, and ethical objections to anatomization beyond the obvious and adds an epistemological objection of his own. *Anatomie* contains Locke's rejection of microscopic anatomization in a singularly direct form.

> For after all the fine discourses of the . . . changes he supposes to be the cause of this or that disorder in the body, it is certainly something more subtle and fine than what our senses can take cognisance of that is *the cause of the disease*, and they are *the invisible and insensible parts* that govern preserve and disorder the oeconomie of the body. . . . Hence a fright which causes such diseases as epilepsy, hysterical fits, and fatuity often cures others . . . and 'tis probable in these cases 'twould puzzle the quickest sighted anatomist, assisted too by the best microscope, to find any sensible alteration made either in the juices or solid parts of the body.[109]

Locke, undoubtedly aware of Sydenham's description of hysteria, correctly points out the power of certain experiences to elicit abnormal behavior and the inability of material anatomization to reveal the precise mechanisms mediating that behavior. But the quote suggests an important conceptual difficulty in Locke's argument, a difficulty which reappears in the same fragment when he speaks of "a little creature by the help of microscopes lately discovered," an "animal soe small that it is not to be discerned by the naked eye." He then challenges the microscopist to "take this animalculum . . . and when he can but show the *parts* in one of these insects I shall believe he will be able to show the very *operations of those parts* in man. Until he does that he does very little towards the discovery of the *cause and cure of diseases*." [110] Aside from providing

[107] H. W. Robinson, W. Adams (eds.), *The Diary of Robert Hooke 1672-1680*, London: Taylor and Francis, 1935, p. 163.
[108] *Ibid.*, p. 177.
[109] Dewhurst, *op. cit.*, p. 7, italics added.
[110] *Ibid.*, pp. 7-8, italics added.

grounds for questioning Locke's familiarity with the *Micrographia*, published three years earlier, in which Hooke " showed the parts " of insects precisely as Locke demanded [111] and optimistically sketched the untapped potentialities of microscopy, these passages imply that the microscope is incapable of improvement, that what could not be observed then could never be observed.

Such an untenable argument suggests that there may be tacit propositions guiding it, which in Locke's thought are his epistemological objections to microscopy.

> Now it is certaine and beyond controversy that *nature performs all her operations on the body by parts so minute and insensible that I thinke noe body will ever hope or pretend, even by the assistance of glasses . . . , to come to a sight of them* . . . and though we cut into these inside, we see but the outside of things and make but a new superficies for ourselves to stare at.[112]

We are limited to the husks of things. Every increase in the magnification and resolution of our instruments brings before our eyes only a new dumb surface, uninterpreted and perhaps uninterpretable, for we " cannot possibly know " the microscopic constitution of organisms. " We . . . in vain search for that constitution within the body of a fly or an elephant, upon which depend those qualities and powers we observe in them." [113] This restriction of Locke's is akin to his denial of any knowledge of substances or real essences. He remarks in his *Essay* that " the active and passive powers of bodies, and their ways of operating " comprise " a texture and motion of parts which we cannot by any means come to discover." [114] " There is not so contemptible a plant or animal, that does not confound the most enlarged understanding." For their " internal constitution, whereon their properties depend, is unknown to us: . . . that texture of parts, that real essence . . . the fine contrivances and inconceivable real essence of plants and animals " are all unknowable [115] according to Locke's epistemology.

The important logical confusion in these passages springs from Locke's exemplification of " the *cause* of the disease " in terms of " invisible and insensible *parts*," and his confession that if a microscope could reveal the " parts " of a mite he would concede that the " operations of those parts in man " could also be revealed. In so far as Locke is arguing that the microscope can never visualize causes or meanings simply because they

[111] R. Hooke, *Micrographia*, London: Martyn and Allestry, 1665, Observation 43.
[112] Dewhurst, *op. cit.*, italics added.
[113] *Essay*, IV, 6, 11.
[114] *Ibid.*, IV, 3, 16.
[115] *Ibid.*, III, 6, 9.

are explanatory terms which are unobservable in principle, he is stating a fundamental logical principle of the atomic explanation of observable events;[116] or, less strikingly, he is stating the grammatical truth that parts cannot be causes nor structures functions. But Locke did not fully appreciate this modern notion of atomic explanation, even though it is implied by his explanation of experienced secondary qualities by radically unobservable primary qualities. He clings to the requirement that causes (primary qualities) must be *picturable* while he rejects the idea that they are *observable* by any means. This leads to Locke's apparent inconsistency of picturing material entities, invisible to the naked eye, as causes of observed events, and at the same time denying that these minute entities can ever be observed even with refined instruments. He accordingly makes statements which confuse permanent logical impossibility of observation (in principle, by grammatical definition or by the nature of atomic explanation) with temporary technical impossibility of observation (in practice). Thus Locke, like Sydenham, fails to distinguish between real essences in the sense of traditional occult forms and qualities, unobservable in principle, and real essences in the sense of material entities invisible to the naked eye, unobservable in practice because of the imperfect seventeenth century microscopes, but observable, in principle, with better instruments. The overall impact of their argument is a rejection of all quests after mechanisms and causes that are invisible to the naked eye, whether observable in the principle or not: ". . . we are," writes Locke, " so far from being capable of any such thing, that I conclude it lost labour to seek after it." [117]

In several revealing passages, however, Locke does consider the implications of an instrumental extension of perception, and it is here that his ethical bias is most manifest.

> Had we senses acute enough to discern the minute particles of bodies, and the real constitution on which their sensible qualities depend, I doubt not but they would produce quite different ideas in us: . . . This microscopes plainly discover to us; for what to our naked eyes produces a certain colour, is, by thus augmenting the acuteness of our senses, discovered to be quite a different thing; . . .[118]

If our perceptions were so augmented, we would not only have different perceptions of things but would also be able to grasp immediately their

[116] N. R. Hanson, *Patterns of Discovery. An Inquiry into the Conceptual Foundations of Science*, Cambridge: Cambridge Univ. Press, 1958, pp. 119-126.

[117] *Essay*, IV, 3, 29; cf. also R. Yost, "Locke's rejection of hypotheses about submicroscopic events," *J. Hist. of Ideas*, 1951, *12*: 111-130.

[118] *Essay*, II, 23, 11.

possible actions: "I doubt not but if we could discover the figure, size, texture, and motion of the minute constituent parts of any two bodies, we should know without trial several of their operations one upon another . . ." [119] But elsewhere Locke more rigorously follows the logic of his epistemology to its sceptical conclusion—a denial of any deducible relationship between primary and secondary qualities—and this is an even "more incurable part of ignorance" than our separation from primary qualities and real essences: "there is no discoverable connexion between any secondary quality and those primary qualities which it depends on." [120] This, then, is another epistemological objection to microscopic anatomy: even if the ultimate invisible corpuscles of things could be perceived by arming the vision with a perfect microscope, the information obtained would be worthless, because there is no known logical relationship between the realms of primary and secondary qualities and, therefore, no predictions could ever be made concerning the latter from a knowledge of the former. That a reliable relationship exists at all between primary and secondary qualities, like the assertion that nominal essences actually "depend on" real essences, is a gratuitous gesture of Locke's God which opposes the sceptical conclusions of Locke's logic.

Locke also shares with Sydenham the notion that the Supreme Artificer preordains man's possible and proper sphere of perception.

> The infinite wise Contriver of us . . . hath fitted our senses, faculties, and organs, to the conveniences of life, and the business we have to do here. We are able, by our senses, to know and distinguish things; and to examine them in so far as to apply them to our uses . . . Such a knowledge as this . . . is suited to our present condition . . .[121]

It is impossible, Locke argues, for men to transcend the divinely determined purlieu of sensation. Men are limited to perceiving objects that are appropriate for the place in the chain of beings assigned to them by a God who orders all things for the best. "God has no doubt made them so as is best for us in our present condition." [122] It is *hubris*, a sin of intellectual pride, to anatomize the world beneath its superficies. But even if, for the sake of speculation, that impossible knowledge of the radical fabric of the world were to become possible by extending the senses through instruments, such knowledge would be both dangerous and useless. Useless, because "if by the help of such *microscopical eyes* . . . a man could penetrate further than ordinary into the secret composition and

[119] *Ibid.*, IV, 3, 25.
[120] *Ibid.*, IV, 3, 12.
[121] *Ibid.*, II, 23, 12.
[122] *Ibid.*, II, 23, 13.

radical texture of bodies, he would not make any great advantage by the change, if such an acute sight would not serve to conduct him to the market and exchange." [123] Dangerous, because the man who sees permanently (a bizarre restriction by Locke) with microscopical eyes " would be in a quite different world from other people: nothing would appear the same to him and others: " and this fact " would be inconsistent with our being, or at least wellbeing, in this part of the universe which we inhabit." [124] These fundamental ethical and epistemological objections to microscopic knowledge beautifully exemplify what Lovejoy calls Locke's " ethics of prudent mediocrity." [125]

An imaginary sceptical physician influenced by Sydenham and Locke would reject microscopic anatomy because it is logically impossible (primary qualities are unobservable), theologically impossible (God determines the possible knowledge of each link in his chain of beings), sinful (to presume to anatomize is to commit an intellectual sin and to rebel against one's duty), meaningless (microscopes reveal only new superficies, as uninterpretable as the ones formerly known), reactionary (microscopic entities and events too closely resemble the occult forms of the Scholastics), unrealistic (no man has yet dreamed of the fabulous complexity of living bodies), dangerous (unalterable microscopic vision would lead to death in a world of markets), and utterly useless (secondary qualities are not logically derivable from knowledge of primary ones; diseases are caused by a divine unknowable quiddity). The pariah physician, Gideon Harvey, adds that anatomy of any sort other than the immediately useful variety is a fraudulent advertisement by the doctors'guild,[126] the microscopic corpuscles of the experimental philosophers are as hypothetical and useless as the occult forms they supposedly replace,[127] and everything seen through a microscope is merely artifactual.[128] And the microscope was rapidly becoming a toy of scientific dilettantes. The superficially seductive arguments of Locke and Sydenham, when combined with the enormous amount of effective satire directed against the Royal Society in general and especially against the microscope,[129] comprise an intellectual opposition

[123] *Ibid.*, II, 23, 12.
[124] *Ibid.*
[125] Lovejoy, *The Great Chain of Being*, p. 200.
[126] G. Harvey, *op. cit.*, pt. 1, chap. 2 & Introduction.
[127] G. Harvey, *The Vanities of Philosophy and Physick*, 2nd ed., London: W. Turner, 1700, p. 9.
[128] G. Harvey, *Conclave*, p. 25.
[129] Cf. M. H. Nicolson, " The microscope and English imagination," in her *Science and Imagination*, Ithaca, N. Y.: Great Seal Books, 1956, pp. 155-234.

to microscopy that could hardly fail to divert eighteenth century biologists from any serious concern with the systematic use of that instrument, despite the scientific optimism of the classical microscopists.

3. Scientific Optimism in Seventeenth Century Microscopy

Bacon, Boyle, Sydenham, and Locke all appreciate the stunning complexity of nature. But here their ways diverge. Bacon and Boyle, in the face of nature's abyss of causes, double the energies of their inquiry and anatomize experience with instruments; while Sydenham and Locke, the sceptical physicians, sift the husks of things with unarmed vision. One rank of Bacon's "prerogative instances" comprises those phenomena which "warn the understanding of the admirable and exquisite subtilty of nature, so that it becomes roused and awakened to attention, observation, and proper inquiry."[180] Bacon quotes the saying attributed to Democritus, that "the knowledge of nature lies concealed in deep mines and caves."[181] In his early work, *Essays on the Law of Nature*, Locke alludes to the same passage, urging men to invent machines in order to mine the veins of natural knowledge.[182] This is the closest Locke comes to arguing for the necessity of instrumental aids in the anatomization of nature. But even in this passage, as in many of Bacon's,[183] 'machine' or 'instrument' is a nebulous notion referring as much to logical rules (Bacon's induction was such an 'instrument') as to physical devices which extend the senses. There is no doubt, however, that Bacon and Boyle recommend physical instrumentation in the anatomization of experience.

Bacon's emphasis upon the physical and logical instrumentation of human understanding, and upon the need to anatomize nature to an atom, is the grand inspiration for the classical microscopists and the foundation of their optimism. The Preface to Robert Hooke's *Micrographia* (1665) is a paean sung to Bacon. The ocular philosophy of Hooke is one of the fullest statements ever made of the prime role instruments play in enlarging the limits of human perception and opening novel realms to be anatomized and understood. Like Sydenham and Locke, Hooke knows that "the limits, to which our thoughts are confind, are small in respect to the vast extent of Nature itself; . . . from thence it must follow, that not

[180] *Novum organum*, Bk. 2, Aphorism 43.
[181] *Advancement*, p. 81.
[182] W. von Leyden (trans. & ed.), Locke's *Essays on the Law of Nature*, Oxford: Clarendon Press, 1954, p. 135.
[183] *Novum organum*, Preface and Bk. 1, Aphorisms 2 and 50.

having a full sensation of the object, we must be very lame and imperfect in our conceptions about it, and in all the propositions which we build upon it." [184] But where Locke demurs in scepticism, Hooke optimistically proceeds to anatomize nature to its core, paraphrasing Bacon all the way:

> . . . the footsteps of Nature are to be trac'd, not only in her ordinary course, but when she seems to be put to her shifts, to make many doublings and turnings, and to use some kind of art in indeavouring to avoid our discovery.
>
> The next care to be taken, in respect of the Senses, is a supplying of their infirmities with Instruments, and, as it were, the adding of artificial Organs to the natural; this in one of them has been of late years accomplisht . . . by the invention of Optical Glasses. . . . by the help of Microscopes, there is nothing so small, as to escape our inquiry; hence there is a new visible World discovered to the understanding. . . . It seems not improbable, but that by these helps the subtilty of the composition of Bodies, the structure of their parts, the various texture of their matter, the instruments and manner of their inward motions, and all the other possible appearances of things, may come to be more fully discovered.[185]
>
> And there is no doubt, but there is yet behind, much more to be discovered, than what is already known, if fit methods . . . be apply'd, and prosecuted with diligence.[186]

A more comprehensive denial of Locke's sceptical rejection of microscopy is hard to imagine. What has been called " the indiscriminate zeal of Hooke " [187] was no more excessively optimistic than the views of other early microscopists, or of Bacon himself. For Bacon maintained that " the lately invented microscopes . . . exhibit the latent and invisible minutiae of substances, and their hidden formation and motion," with such magnification that Democritus " would have exulted in the thought of a means being discovered for seeing his atom, which he affirmed to be entirely invisible." [188] Soon after Bacon, Prince Cesi thought that the microscope could reveal atoms,[189] and so did Petro Borel in 1656,[140] Henry Power in 1663,[141] and Frederic Schrader in 1680; [142] and even Newton in his

[184] Hooke, *op. cit.*, Preface.

[185] *Ibid.*

[186] Gunther, *op. cit.*, vol. VII, p. 741.

[187] B. Farrington, *Francis Bacon. Philosopher of Industrial Science*, New York: H. Schuman, 1949, p. 138.

[188] *Novum organum*, Bk. 2, Aphorism 39.

[189] C. Singer, " Notes on the early history of microscopy," *Proc. Roy. Soc. Med.*, 1913-1914, *7*: 247-279.

[140] P. Borellus, *Observationum microscopicarum centuria*, The Hague: A. Vlacq, 1656, Dedication & Preface.

[141] H. Power, *Experimental Philosophy*, London: Martyn and Allestry, 1664.

[142] F. Schrader, *De microscopiorum usu in naturali scientia*, Göttingen: Fuhrmann, 1681, pp. 6-7.

Optics—a book well known to Locke [143]—agreed.[144] Locke occasionally used a lens for minor magnifications [145] and knew instrument makers such as Michael Butterfield and Jean Hautefeuille,[146] as well as ocular theorists like his close friend William Molyneux.[147] Locke even met Leeuwenhoek in Holland.[148] Although he was certainly aware of the radical optimism prevalent among the microcopists, Locke's scepticism did not yield to their optimism.

We must be sceptical and doubting, say Bacon and Boyle, for the way to natural knowledge is strewn with thorns and pitfalls. Their fruitful sort of scepticism opposes the arguments of Locke and Sydenham: "the whole tendency of such positions is wilfully to circumscribe man's power, and to produce a despair of the means of invention and contrivance," Bacon complains in *Novum organum*.[149] For "by far the greatest obstacle to the advancement of the sciences, and the undertaking of any new attempt or department, is to be found in men's despair and the idea of impossibility." [150] The microscopic anatomization of organisms was such a new attempt, and the rejection of this endeavor by Sydenham and Locke on myriad grounds was certainly a great obstacle to the systematic exploitation of that instrument in the eighteenth century. For that century was *their* century, a time of Lockean theories of knowledge and elegant nosologies, with the implied scepticism of both militating against microscopic anatomization. In biological microscopy the fruitful scepticism, the "diligent kind of doubting" [151] of Bacon and Boyle was in abeyance. And it required many years for the gentle words of Nehemiah Grew to prevail: The microscope

> may in some measure prove effectual; How far, I promise not: the way is long and dark . . . the way of nature is so impervious, and, as I may say, so down-hill and up-hill, that how far soever we go, yet the surmounting of one difficulty, is wont still to give us the prospect of another. . . . but because we cannot attain to all, that therefore we should do nothing, is an inference that looks so much away

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[143] Fox Bourne, *op. cit.*, vol. II, p. 216.

[144] Sir I. Newton, *Optics*, Bk. 2, Pt. 3, Proposition 7.

[145] J. Lough, *Locke's Travels in France*, containing excerpts from Locke's *Journals*, Cambridge: Cambridge Univ. Press, 1953, pp. 94, 99, 250.

[146] *Ibid.*, Introduction, p. xl.

[147] Cf. *Some Familiar Letters* (above, footnote 94) for Locke's friendship with W. Molyneux. The latter's optical theories are in his *Dioptrica nova*, London: B. Tooke, 1692, cf. pp. 281, 290 for microscopy.

[148] Cranston, *op. cit.*, p. 238.

[149] *Novum organum*, Bk. 1, Aphorism 88.

[150] *Ibid.*, Aphorism 92.

[151] *Advancement*, p. 92.

from the practical sense of men, that it ought not to be answered. Nor with better reason may we go about determining what may be done. If but a little should be effected, yet to design more can do us no harm; for though a man shall never be able to hit stars by shooting at them, yet he shall come much nearer to them than another that throws at apples.[152]

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[152] Quoted from W. Carruthers, "Life and work of N. Grew," *J. Roy. Microscopical Soc.*, 1902, pp. 129-141.

THE RISE AND FALL OF PROLONGEVITY HYGIENE* 1558–1873

GERALD J. GRUMAN

With aid from the National Institutes of Health, I have been preparing a history of what I have termed "prolongevity," i. e., the belief that it is possible to lengthen significantly the span of life.[1,2] It was necessary in a work of this sort to include a section on prolongevity *hygiene*, the attempt to attain a markedly increased longevity by means of reforms in one's way of life.[3] Today I should like to discuss the most influential Renaissance proponent of this view, Luigi Cornaro, and, after outlining some of his basic ideas, I should like to trace his influence on later times.

In nearly every respect, Luigi Cornaro was a typical member of the Italian nobility during the Renaissance.[4] The Cornaro family, like many others, was caught up in the political life of the city-states of Northern Italy. The interests of the family were centered in Venice, but Cornaro's

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[2] My Ph. D. thesis, "A History of Prolongevity Hypotheses to 1800," was completed at Harvard University (in June, 1960) under the direction of Professors I. Bernard Cohen and Crane Brinton.

[3] I have not seen any monograph dealing specifically with prolongevity hygiene. A gracious introduction to the history of general hygiene is Henry E. Sigerist: *Landmarks in the History of Hygiene*, London: Oxford University Press, 1956. On codes of hygiene for the aged and for lengthening life, there is a good bit of information scattered through Mirko D. Grmek: *On Ageing and Old Age: Basic Problems and Historic Aspects of Gerontology and Geriatrics* (*Monographiae biologicae*, vol. 5, 1958, no. 2), Den Haag: Uitgeverij Dr. W. Junk, 1958, and in Frederic D. Zeman: "Life's later years: Studies in the medical history of old age," *J. Mt. Sinai Hosp.*, 1942, *8*: 1161-1165; 1944-45, *11*: 45-52, 97-104, 224-231, 300-307, 339-344; 1945, *12*: 783-791, 833-846, 890-901, 939-953; 1947, *13*: 241-256; 1950, *16*: 308-322, and 1950, *17*: 53-68. Also there is a very sketchy article by Sona Rosa Burstein: "The 'cure' of old age: Codes of health," *Geriatrics*, 1955, *10*: 328-332. Many early works on hygiene are listed under "Early discussions before 1900" in both volumes of Nathan W. Shock: *A Classified Bibliography of Gerontology and Geriatrics*, Stanford, Calif.: Stanford University Press, 1951, and *Supplement One: 1949-1955*, 1957.

[4] On Cornaro's life and work, see William B. Walker: "Luigi Cornaro, a Renaissance writer on personal hygiene," *Bull. Hist. Med.* 1954, *28*: 525-534; Piero Maroncelli: "Biography of Alvise [Luigi] Cornaro" in John Burdell, ed.: *The Discourses and Letters of Louis Cornaro, on a Sober and Temperate Life*, New York: Fowler and Wells, 1842, pp. 127-153, and Sigerist: *op. cit.*, pp. 36-46.

grandfather, having been banished from that city, had settled in Padua; and there Luigi was born in 1467.[5] By means of shrewd management of his lands he became very wealthy and was able to restore the patent of nobility which had been lost in the Venetian intrigues. In the manner of the time, he was a lavish patron of the arts, and his homes and villas were widely admired, one of them, for example, including decorations by Raphael. During the 1530's and 1540's he was a member of the Paduan circle of Bembo the distinguished humanist, and there he was acquainted with Fracastoro, the poet-physician.

Cornaro's major work was entitled *Discourses on the Temperate Life*.[6] Its most appealing feature, and one which must have gained for it numerous readers, is the success story which serves as its *raison d'être*, a success measured not in terms of income or fame but in health and longevity. According to Cornaro, between the ages of thirty-five and forty he had found his constitution utterly ruined by a disorderly way of life and by frequent overindulgence in sensual pleasure.[7] Indeed, his condition had deteriorated to such an extent as to call forth the warning of the physicians that, without a drastic reform in his habits, he could survive but a few months more. It was in these desperate circumstances that he adopted that temperate and orderly life of which he was to be the most popular exponent. Following this almost-religious conversion, Cornaro rapidly recovered and retained his well-being throughout the middle years and far into old age. In 1550, at the age of 83, Cornaro composed the first *Discourse* propounding his regimen of health; the second discourse was added at the age of 86, the third at 91, and the fourth at 95. According to Maroncelli, the wise patriarch passed away in 1565 at the age of 98.

Cornaro presented four arguments in favor of the desirability of prolonged life. Of these, the first is a simple affirmation of the worth of life and happiness. In his view, both God and Nature are desirous to preserve man as long as possible.[8]

The second reason for the desirability of longevity is that old age is a happy phase of life. Cornaro wrote at the age of eighty-three,

[5] The facts regarding the place and date of Cornaro's birth vary in different accounts of his life; according to Walker, the most reliable study is that of Maroncelli, and I here follow his version.

[6] Luigi Cornaro: *Discourses on the Temperate Life*, in William F. Butler, ed.: *The Art of Living Long*, Milwaukee: William F. Butler, 1903, pp. 37-113.

[7] On Cornaro's illness and his recovery of health through temperance, see *ibid.*, pp. 42-47.

[8] *Ibid.*, p. 61.

> . . . I have an ardent desire that every man should strive to attain my age, in order that he may enjoy . . . the most beautiful period of life.[9]

Cornaro claimed that, despite his advanced years, his senses were in perfect condition, his disposition cheerful, he was able to climb stairs easily, and his teeth remained well preserved. He also described eagerly his reading and writing, his conversations with scholars and artists, his lovely homes and gardens, his travels and, closest to his heart, the company of his eleven grandchildren.[10]

After the disarming *joie de vivre* of his first two arguments, Cornaro moved on to an unexpectedly calculating one. Pointing to those who exclaimed that a short, tempestuous life is better than a long, sombre one, he cautioned,

> They do not pause to consider what immense importance ten years more of life . . . possess when we have reached mature age, the time, indeed, at which men appear to the best advantage in learning and virtue—two things which can never reach their perfection except with time.[11]

Cornaro's fourth reason why prolongevity is desirable is that, if one lives long enough, one will attain the blessing of a "natural death"; i. e., one's vital powers will slowly have become exhausted and one will pass away peacefully and easily.[12]

Turning from the desirability of long life to its possibility, we find the Italian nobleman quite firm in extending the life-span beyond the Biblical "three score and ten or at most four score." He believed that any person, even one handicapped by a delicate constitution, could live to the age of a hundred, while those endowed with a strong constitution could aspire to 120 years.[13] Moreover, this long life, as we have seen, will be healthy and happy to the very end.

Cornaro's regimen aimed at prolonging life by *conserving* the vital principle of the body.[14] Every individual is born with a certain amount of the vital principle which is gradually used up by the body's activities.

[9] *Ibid.*, p. 66.
[10] *Ibid.*, pp. 66-72, 92-93.
[11] *Ibid.*, p. 59.
[12] *Ibid.*, p. 65; see also *pp.* 73-74, 80, 107. The concept of "natural death" was far from new; in Aristotle the distinction already was made between death from forcible extinction of the innate heat and death from gradual exhaustion of the innate heat; Aristotle: *De iuventute et senectute*, G.R.T. Ross, transl. in W. D. Ross, ed.: *The Works of Aristotle, Translated into English*, Oxford: The Clarendon Press, 1931, vol. 3, p. 469b.
[13] Cornaro: *op. cit.*, pp. 78, 106.
[14] This analysis is based on *ibid.*, pp. 63-65, 78-79, 85, 106-107.

As this principle of life is consumed, it cannot be regained, but, by leading a temperate life, one may determine that the supply will last for the time allotted by God and Nature, 100-120 years.

The keystone of Cornaro's regimen was temperance, especially in regard to diet. He attributed his health and longevity to:

> . . . these two very important rules which I have always so carefully observed, relative to eating and drinking,—namely, to take only the quantity which my stomach can easily digest and only the kinds that agree with it. . . .[15]

As one matured, it was absolutely essential to reduce the amount of food taken in, because the "natural heat" decreased in the elderly, and, therefore, they required little food (as fuel).[16] In time his diet came to consist of small portions of bread, meat, broth with egg, and mild wine.[17] Along with temperance in diet, it also was helpful to be moderate and orderly in all other things, to guard against great heat or cold, fatigue, melancholy, hatred, and other debilitating influences. In view of his success with this method, the hygienist concluded that, "a man can have no better doctor than himself, and no better medicine than the temperate life."[18]

The *Discourses* gained a wide and enthusiastic audience.[19] The work had appeared in Italian in 1558; it soon was translated into Latin, then into English, French, German, and Dutch. The warmest reception was in England where, in 1711, it received the endorsement of Joseph Addison in his influential periodical *The Spectator*:[20] an idea of its popularity there is suggested by the fact that one English version during the eighteenth and nineteenth centuries went through fifty editions. Moreover, the discourses stimulated the production of a host of similar works, all more or less founded on the idea that *longevity can be extended significantly by simple reforms in the individual's habits of life.*

The hygienists of the Cornaro tradition assumed that man is healthy by nature and would no longer be subject to disease if he led a simple and moderate life. There is a large measure of individualism in this, for, if God and Nature have endowed man with health, there is little need for organized medicine; as Cornaro reasoned, "a man can have no better

[15] *Ibid.*, p. 48.
[16] *Ibid.*, pp. 105-106.
[17] On Cornaro's diet, see Sigerist: *op. cit.*, pp. 41-42.
[18] *Ibid.*, p. 58.
[19] The various translations and editions of the *Discourses* are discussed in Walker: *op. cit.*, pp. 530-533 and Sigerist: *op. cit.*, pp. 45-46.
[20] *The Spectator*, October 13, 1711.

doctor than himself." All this blended rather well with a popularized version of Galenic pathology in which disease represents simply an imbalance in the humors of the body.

Another contributing factor in the acceptance of regimens of the Cornaro type was the widespread credulity about the human life span. There was general belief that people in the past or in other parts of the world enjoyed remarkable longevity; indeed, there was a tendency to accept such accounts even when the cases were located in one's own time and country. A prime example is William Harvey's report on the autopsy of Thomas Parr: Harvey represented the most advanced scientific thought of his time, yet he wrote in a matter-of-fact manner that Parr had reached the age of "one hundred and fifty-two years and nine months." [21] The report also demonstrates another bias which favored Cornaro's ideas; Harvey attributed the longevity of Parr to the poor farmer's meagre diet, his being "free from care," and his breathing the country air of "perfect purity." These naïve views regarding longevity gave added attraction to prolongevity hygiene, for Cornaro had asserted it to be possible for the average person to live out the *full* span of life allotted "by God and Nature." He himself had set the life span at the comparatively modest figure of 120 years, but there was no reason why others might not extend this to the 152 years of Parr or even beyond that.

Cornaro found an articulate disciple in Leonard Lessius, a Belgian Jesuit who stressed the religious aspects of the temperate life.[22] In Lessius' *Hygiasticon* published in 1613, every one of Cornaro's themes finds an echo: like Cornaro, the Belgian writer claimed that his life was despaired of by the physicians until he adopted the sober life; he praised moderation, especially in diet; he asserted that simple reforms in one's way of life will free one from virtually all disease and will insure a happy, healthy old age, an increase in longevity, and an easy "natural" death. Like most of the hygienists, he had a special feeling for the simple peasants and artisans "who contentedly live on plain country fare, with temperance and due labor." [23] In the writings of the Jesuit scholar there is less of the sunshine and exuberance of the Renaissance and more of the rigid disci-

[21] William Harvey: "The anatomical examination of the body of Thomas Parr," in *The Works of William Harvey*, Robert Willis transl., London: Sydenham Society, 1847, pp. 587-592.

[22] Leonard Lessius: *Hygiasticon*, Timothy Smith, transl., London: Charles Hitch, 1742.

[23] *Ibid.*, p. 40.

pline and self-denial of the Counter Reformation. Yet, like Cornaro's, his thought represents a curious mixture of worldly and heavenly aspirations.

For a more secular point of view, we may turn to Sir William Temple's essay, "Of health and long life."[24] The seventeenth-century diplomat and *littérateur* was himself "too much the libertine" to value longevity at the price of a sober regimen; however, with the "intention of some public good" he brought together his observations on the subject, and they feature several of the typical notions of prolongevity hygiene. For one thing, there is the credulity about the life span: the natives of Brazil and the Brahmans of India are reported to live two to three hundred years, while the Hebrew patriarchs lived still longer; the explanation for this must be their natural and simple way of life. The English essayist added with some pride that his own land had produced cases of remarkable longevity even in modern times: the most preeminent was "old Parr" who lived to nearly 153 "and might have, as was thought, gone further, if the change of country air and diet for that of the town had not carried him off." Then there was the Countess of Desmond who, though hounded by poverty, lived above 140. Temple asserted that he himself had met a beggar whose scant diet had brought him to the age of 124. The evidence indicated that the recipe for great longevity was the temperate life.

The greatest exponent of prolongevity hygiene, next to Cornaro, was the illustrious German physician Christoph Hufeland, who set the human life-span at 200 years. A member of the Weimar group, Hufeland was a friend of Goethe, Schiller, and Herder, while, in medical circles, he was known for introducing into Germany Jenner's new method for smallpox vaccination.[25] In his *Art of Prolonging Life* (later titled *Makrobiotik*) published in 1796, Hufeland saw great possibilities for improving longevity.[26] Hufeland had a glowing admiration for Cornaro and his hypothesis that life may be lengthened by temperance.[27] The body, wrote the German physician, is born with a certain quantity of "vital power" which may be used up either quickly or slowly, depending on one's way of life.[28] To prolong life, it is necessary that this vital power be conserved; one must live *extensively* rather than *intensively*. The *leitmotif*

[24] William Temple: "Of health and long life," in *The Works of Sir William Temple*, London: Printed for J. Brotherton, et al., 1770, vol. 3, pp. 266-303.

[25] Zeman: *op. cit.*, 1945, *12*: 949 and Grmek: *op. cit.*, pp. 67-68.

[26] Christopher William Hufeland: *The Art of Prolonging Life*, London: J. Bell, 1797, vol. 1, pp. 175-176.

[27] *Ibid.*, pp. 10-14, 21-25. Hufeland warned, however, that Cornaro's own regimen was too severe for most patients.

[28] *Ibid.*, pp. 62-65, 69-73.

of the work was similar to Cornaro's: moderation in all things, especially in diet.[80] As usual, the heroes of the treatise are the simple, working people in a rural environment:

> The most extraordinary instances of longevity are to be found . . . among those classes of mankind who, amidst bodily labor, and in the open air, lead a simple life agreeable to nature, such as farmers, gardeners, hunters, soldiers and sailors. In these situations man still attains to the age of 140, and even 150.[80]

The suppositions of prolongevity hygiene persisted far into the nineteenth century; a noteworthy illustration of this is William Sweetser's *Human Life* published in 1867.[81] A professor of medicine at the University of Vermont and later at Bowdoin, Sweetser is remembered for coining the term "mental hygiene."[82] In his work, there appear all the famous cases of unusual longevity; e. g., Henry Jenkins and Thomas Parr.[83] As we might expect, one of the chief means proposed for attaining such a duration of life was temperance.[84]

Meanwhile, on a more popular level, the Cornaro theme continued in full force; for example, D. H. Jacques' *Physical Perfection*, published in 1859, included a chapter on "The secret of longevity."[85] The secret, of course, is moderation in all things, for "the energy of life is in inverse ratio with its duration." Jacques also mentions ten "well-authenticated" instances of persons in modern times living beyond 150 years. The hero of the essay is Cornaro who demonstrated "the extent to which one's health and longevity are in his own hands."

However, by the last quarter of the nineteenth century, the main tenets of prolongevity hygiene had become seriously challenged. Already during the eighteenth century, the "benevolent despots" of Europe had begun

[80] *Ibid.*, p. 167.

[80] *Ibid.*, p. 141.

[81] William Sweetser: *Human Life: Considered in its Present Condition and Future Developments, Especially with Reference to its Duration*, New York: G. P. Putnam, 1867.

[82] Howard A. Kelly and Walter L. Burrage: *Dictionary of American Medical Biography*, New York and London: D. Appleton, 1928, p. 1182, and Arturo Castiglioni: *A History of Medicine*, E. B. Krumbhaar transl.; New York: Alfred A. Knopf, 1947, p. 1102.

[83] Sweetser: *op. cit.*, pp. 164-180.

[84] *Ibid.*, pp. 217-238.

[85] Daniel Harrison Jacques: *Physical Perfection: or, the Philosophy of Human Beauty; Showing how to Acquire and Retain Bodily Symmetry, Health and Vigor, Secure Long Life, and Avoid the Infirmities and Deformities of Age*, New York: Fowler and Wells, 1859, pp. 207-220.

to accept the idea that health is a responsibility of the state rather than the individual; this trend was continued by the reforms of the French Revolution.[36] In the nineteenth century, the problems of industrialization and urbanization stimulated the Sanitation Movement with a further extension of *social* hygiene.[37] Meanwhile, traditional humoral pathology had been superseded by the development of pathological anatomy and bacteriology with their revelation of complex and remorseless forces causing disease on a microscopic level quite beyond the ken of the common-sense assumptions of the Cornaro school. With the development of antisepsis, anesthesia, and serology, medicine had effective weapons against disease: vaccines, anti-toxins, precision surgery, and the techniques of epidemiology. In view of these powerful methods of organized medicine and public health, it could no longer be maintained with Cornaro that "a man can have no better doctor than himself and no better medicine than the temperate life." [38]

At the same time, the belief in super-centenarians was eroded by statistical analysis and historical criticism. The turning point was the publication in 1873 of William J. Thoms' *Human Longevity, Its Facts and Its Fictions*.[39] Thoms, a librarian at the House of Lords, was, in his spare time, an antiquarian and is noted for introducing the word "folklore." [40] In his work on longevity, he blamed physicians for their gullibility and turned instead to the life-insurance companies for reliable evidence on the duration of life.[41] Next he laid down the requirements which must be met before a case of extraordinary longevity could be accepted as valid.[42] He especially took issue with the idea that poor inhabitants of rural areas are the most long-lived, pointing out that these were the very localities in which records were most inadequate.[43] A chapter was devoted to disproving each of the renowned English cases of long life.[44] These activities brought Thoms into bitter controversy, for Henry Jenkins had been honored with an expensive monument by his fellow Yorkshiremen,

[36] George Rosen: *A History of Public Health*, New York: MD Publications, 1958, pp. 161-170.

[37] *Ibid.*, pp. 192 ff.

[38] Cf. Richard H. Shryock: *The Development of Modern Medicine*, Philadelphia: University of Pennsylvania Press, 1936, chapter 16: "Public Confidence Regained."

[39] William J. Thoms: *Human Longevity, Its Facts and Its Fictions*, London: John Murray, 1873.

[40] Zeman: *op. cit.*, 1950, *17*: 56-58.

[41] Thoms: *op. cit.*, pp. 7-13, 27-30.

[42] *Ibid.*, pp. 31-66.

[43] *Ibid.*, pp. 18-30.

[44] *Ibid.*, pp. 67-104.

while Thomas Parr, as a national hero, had been interred at Westminster Abbey.

With his spirited, rather sarcastic arguments, Thoms destroyed one of the chief pillars of prolongevity hygiene.[45] If even the most extreme life-span was limited to 100, as he asserted, then the hope of greatly extending the average length of life could no longer, in the manner of Cornaro, be focused on simply conserving the body's vital powers. It appeared that God and Nature had not been so generous in allotting years to man, and if he desired a greater longevity, he would have to achieve some significant breakthroughs in science and medicine.

[45] Thoms' work aroused the British Medical Association to set up committees to collect accurate statistics on disease and old age; Zeman: *loc. cit.*

THE INFLUENCE OF BENJAMIN RUSH ON THE PRACTICE OF BLEEDING IN SOUTH CAROLINA

JOSEPH IOOR WARING*

Benjamin Rush based his enthusiasm for frequent and profuse bleeding upon the teachings of Thomas Sydenham who bled for various ailments. Though Sydenham in later life apparently foreswore the practice in its extreme form, Rush paid no attention to this moderation of practice and became one of the foremost bloodletters of his time. He took his principles of treatment not only from Sydenham but also from his old preceptor, Dr. John Redman of Philadelphia,[1] who was once an exponent of bleeding but later in life also discarded venesection.

As an Edinburgh graduate, Rush was also under the influence of William Cullen who was much inclined to the free use of bleeding in " inflammatory diseases." With Rush at Edinburgh were five physicians who were to practice in South Carolina, Peter Fayssoux, Tucker Harris, Alexander Baron, Thomas Tudor Tucker, and Isaac Chanler. Doubtless they absorbed to some degree the same doctrine which Rush was to seize upon and promote to its ultimate estate. Harris' notes[2] on Cullen's lectures bear witness to the preachment of liberal bleeding, but perhaps he was not a proper convert, for in a surviving bill[3] for his services to a large family, including slaves, for a period of one year (1781), Harris notes that he paid 121 visits but found only one occasion for bleeding.

After returning to Philadelphia, Rush developed great popularity and esteem and attracted a large number of apprentices, having some 135 such associates in the period from 1792 to 1811. Of this number, thirteen from South Carolina lived in close association with the master and were no doubt sufficiently impressed by Rush's enthusiasm and interpretation of his experience to carry the gospel of profuse bleeding back to their chosen area for practice.

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[1] *City Gazette* (Charleston), Oct. 29, 1793. Letter from Rush to John Rogers.

[2] Ms. notes in Library of The Medical Society of South Carolina.

[3] Bill of Tucker Harris, Historical Commission of South Carolina.

The older medical records from South Carolina have very little to say about bleeding. A bill[4] of Dr. John Martini (1736) mentions bleeding five times in the course of sixty-four visits. John Lining in his description of the yellow fever of 1748 mentions bleeding only casually, though his earlier bill of 1738 to the Vestry of St. Philip's Church says of the poor of the parish that "he attended many and only bled them finding no occasion for Physick" in his treatment of smallpox. George Milligen[5] wrote in 1763 that one should bleed with caution in the slow nervous fever, but that loss of some moderate amount of blood was necessary in intermitting fevers, pleurisy, and peripneumonies.[5] Lionel Chalmers says little of it in his book published in 1776. Indeed, in his *Essay on Fevers* of 1768, he is quite violently opposed and says: "Scarcely any thing deserves more reprehension, than the rash, undistinguished, and repeated free use of the lancet; for however necessary it may be to take away blood on particular occasions, beyond all doubt, this is frequently done when it ought to be omitted. Nor does any disease require such a waste of the vital fluids, as is too often made; by which means the patient is left to struggle with the double danger of the distemper and extreme weakness."[6] However, in a letter[7] to Rush in 1772 he does admit that "bleeding when the person is plethoric may be necessary," and speaks of taking a pint of blood from a patient with rabies, but this was a very exceptional situation.

James Kilpatrick, Charleston's advocate of smallpox inoculation, apparently did some bleeding, but he had little to say about it and specifically advised against it in the onset of inoculated smallpox except in such patients as were in "raging delirium." He speaks of the use of bleeding in the epidemic of smallpox in Charleston in 1738 and says that the practice was condemned by many people, presumably medical people, but that many patients recovered under the use of the lancet.[8] A bit of doggerel in the *South Carolina Gazette* of July 3, 1775, implied that local popular sentiment was against the use of phlebotomy and said:

> The People alarmed at such proceeding
> Resolve (tho' in Fevers) not to be bleeding.

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[4] Ms. bill of John Martini in Library of The Medical Society of South Carolina.

[5] George Milligen, *A Short Description of the Province of South Carolina* (London, 1770); written in 1763.

[6] *An Essay on Fevers: More Particularly Those of the Common Continued and Inflammatory Kinds*, &c., by Lionel Chalmers, M. D. of Charles-Town (London, 1768).

[7] Letter of Chalmers to Rush, Nov. 18, 1772, Library Company of Philadelphia (Ridgeway Branch).

[8] James Kilpatrick, *An Essay on Inoculation Occasioned by the Smallpox Being Brought into South Carolina in 1738* (London, 1743).

Peter Fayssoux[9] of Charleston, writing to Rush in 1770, the year in which Rush began his practice, has nothing to say for or against bleeding. He does have something to say about the physicians in Charleston and expresses himself this way: "Few places have the science of medicine on worse footing than this (it is sufficient for a man to call himself a Doctor,

FIG. 1. Book Plate of Thomas Smith Denny, M. D. Late eighteenth century (Charleston)

and immediately he becomes one, and finds fools to employ him)." Lionel Chalmers in his *Essay on Fevers*[10] in 1768, says: "In South Carolina yet, be this operation [bleeding] so needful or not here, it is nowhere more practiced." Whether he refers to bleeding in fevers or the common practice of bleeding in health is not clear, but this passage indicates that bleeding was still a common treatment before the days of Rush. Evidently there were differences of opinion among the Carolina doctors.

[9] Fayssoux to Rush, 1770, Library Company of Philadelphia (Ridgeway Branch).
[10] Chalmers, *An Essay on Fevers* (1768).

A local admirer of Dr. David Ramsay, Dr. George Carter,[11] writing on the epidemic of yellow fever of 1796, says that the Charleston faculty was divided on the subject of bloodletting. He says: "Much depends on depleting the vessels and attenuating the blood. This can be effected by gentle and moderate bleeding, lenient purgatives. . . ." Carter evidently belonged to the conservative group.

Benjamin Rush was a man of many fine qualities, an active humanitarian, and a man esteemed very highly by most of his compatriots. He had developed a theory that all diseases were due to essentially one cause, i.e., vascular tension, and that the universal remedy was to attempt to decrease tension by removing blood in great quantity. Included in his regimen was the administration of ten grains of calomel and fifteen grains of jalap along with the removal of as much as four-fifths of the estimated total amount of blood in an effort to deplete the patient and remove the tension. Unfortunately for some of his patients, in Rush's day the amount of blood was thought to be almost twice what we now consider it, and it is readily seen that removal of an estimated quantity based on that erroneous figure might have amounted to almost complete exsanguination. Despite strong opposition from many of the medical practitioners of Philadelphia, Rush waded through the great yellow fever epidemic of 1793 in Philadelphia in a bath of his patients' blood. His opponents called him a murderer, and public concern was greatly aroused; but Rush pushed on with his theory and his bloodletting and may well have been responsible for some part of the large mortality which the epidemic carried, for Rush's practice was very extensive, and his belief and enthusiasm never faltered. A letter in the *City Gazette* (Charleston) of October 15, 1793, signed "A Physician," offered the thought that Rush's calomel and jalap were appropriate but that because of climatic conditions in Charleston, "it may be presumed that the use of the lancet, which accompanied it in Philadelphia, would in general be contra-indicated." This was not in agreement with Rush's expressed opinion that 19 in 20 cases of the malignant fever required bleeding, and not trifling bleeding, but blood in quantities of 60, 70, or 80 ounces. Indeed, it was reported that occasionally he took 200 ounces.

William Allston of Georgetown, South Carolina, was a pupil of Rush and lived with the Rush family. His inaugural *Essay on Dropsy*, published in Philadelphia in 1797, was dedicated to his old preceptor, Dr. Robert Brownfield of Georgetown, and to Dr. Benjamin Rush, with this

[11] *An Essay on Fevers; Particularly on the Fever Lately so Rife in Charleston, South-Carolina, &c.* (Charleston, 1796).

remark: "Allow me, sir, to make you my sincere acknowledgment for the invaluable discoveries and improvements you have made in medicine." Among these discoveries, no doubt, were included Rush's principles and practices of bloodletting as laid down in his *An Account of the Bilious and Remitting Yellow Fever of 1793*. In this work the following statements are made about bleeding: "I cannot blame myself for not having used it earlier, for the immense number of patients which poured in upon me, in the first week of September, prevented my attending so much to each of them, as was necessary to determine upon the propriety of the evacuation. . . . Bloodletting when used early *on the first day*, frequently strangled the disease in its birth, and generally rendered it more light, and the convalescence was most speedy and perfect."

Rush was insistent that bleeding must be done early to be effective. "In the beginning of September, I found one or two moderate bleedings sufficient to subdue the fever; . . . I bled many patients twice, and a few three times a day. I prefer frequent small, to large bleedings . . . but toward the height and close of the epidemic, I saw no inconvenience in the loss of a pint, even 20 ounces of blood at a time."

Since Rush listed ten varieties of pulses which indicated the use of bleeding, and since the categories ranged from the full, frequent, and tense pulse to the imperceptible pulse, no patient was likely to escape the inevitable. This consequent copious extraction of blood was done in spite of his knowledge and quotation of Dr. Lind that in the yellow fever in the West Indies, "A greater proportion of sailors who had no physicians, recovered from that fever, than of those who had the best medical assistance."

William Allston returned to Georgetown to practice. The first mention of his interest in the propagation of the system of extensive bleeding is in a letter written to Rush concerning, among other matters, Dr. David Ramsay of Charleston. Allston says that he found Ramsay much superior to the common class of physicians and says that: "He is very much in your system of bleeding and using calomel which last he prefers administering without any combination because it remains easier on the stomach and does not as often excite vomiting. This however in most cases (in my opinion) might be obviated by more free use of the lancet," which perhaps implies that Ramsay was far more conservative than Rush or Allston in his use of venesection. Writing from Charleston in 1797,

[19] William Allston to Benjamin Rush, June 21, 1797, Library Company of Philadelphia (Ridgeway Branch).

Allston was not very complimentary about the range of current information among Charleston physicians. He says:[13] "Two of the physicians only have seen your last volume and I am fully convinced that none of them understands it, their practice being of that nature which the professor of the practice of medicine wisely pronounces best in mania, namely random."

Writing later to Rush, Allston says that he expects a comfortable practice in Georgetown but that bloodletting is not popular there. In another letter he speaks again about the fact that he was not received too cordially at first because of the local suspicions that he was an enthusiast for Rush's methods. But Allston was no more discouraged than Rush had been by popular disapproval, and as an encouraging progress note he remarks that even his old preceptor, Dr. Brownfield, was bleeding more than he had ever done.

Allston was not alone in his bleeding activities at this period in South Carolina. A letter of Dr. William Montgomery to Benjamin Rush[14] describes how he and Dr. Ramsay attended a member of the South Carolina Legislature in Columbia and "took from him 165 ounces in five days without affecting his pulse or diminishing his fever. He died. Had we taken a still greater quantity the event might perhaps have been more fortunate for the state of the pulse and not the quantities of the blood that may be drawn ought to regulate the use of the lancet in inflammatory fevers."

Allston again writes to Rush in 1799: "The diseases have been chiefly the remittent bilious fever, etc., and have proved so obstinate as to require even the lancet which I assure you with great pleasure has been used with greater freedom and more success than ever known here. Unfortunately however it has only been resorted to in latter stages of them, but I do not despair of yet having it called even with us Victor Morbi." He notices too that no two physicians in Charleston followed the same type of practice and that the mortality from the fever was high, quoting Dr. Alexander Baron thus: "I wish no person would send for me, for I know nothing of this disease, and am as ignorant as a child unborn—for let me do as I will puke, purge or bleed still they all die."[15]

By 1803 Allston could write again to Rush: "It is with unfeigned pleasure—My dear friend, that I assure you the bleeding System gains ground rapidly. When I first commenced the practice every practitioner

[13] This letter and other Allston letters indicated later refer to the ms. letters of William Allston in the Library Company of Philadelphia (Ridgeway Branch).

[14] Montgomery to Rush, Oct. 6, 1797.

[15] Allston to Rush, Nov. 30, 1799.

reprobated bleeding; now all bleed some most profusely and upon all occasions . . . to open a vein 3, 4, 6 or 7 times in a disease is now with me very common. I have in one case of Pneumony drawn blood 17 different times and the person was nearly cured of it but finally died by a relapse caused by exerting himself. This case, sir, has surpassed any in this place, and so far from the family being opposed to it . . . they have frequently drawn blood before I could arrive. The bleeding doctor is my appelation, and I assure you I begin to find it very profitable to me. It is the most rational remedy I know and the most efficacious."

By 1805 Allston could report further success: "Your principles of medicine are making rapid strides in the southern states. With us, Physicians in this place bleed now profusely who formerly deprecated the practice." And he goes on to speak of his success with the lancet, jalap, and calomel, and how in two cases of bilious yellow fever the patients were bled fifteen times each.

Again in July of 1806, he repeats somewhat the same story: "The terrible dread of bleeding has entirely disappeared and administration of calomel and jalap is now exercised everywhere . . . and to whom is the credit due but to you, my good sir, the author of such principles and practices as will stand the test of time and last so long as there shall be matter to act upon and man to exercise them."

And bloodletting did continue for many, many years thereafter. Since 60 of the 116 physicians who had become members of The Medical Society of South Carolina up to 1813, the date of Rush's death, had been pupils of the Philadelphia phlebotomist, the Rush doctrine must have had abundant advocacy in South Carolina. There is little information to indicate clearly how extensive the local practice was. Whether it went on to the extreme degree to which Rush and Allston advocated it, or whether it was modified and fell into relative disrepute is not clear. Local writings indicate some differences of opinion.

Isaac Auld of Edisto Island, South Carolina, in 1808 reported that the remedy for the fevers of the island consisted of "early large, and repeated bleedings," assisted by purges and emetics.[16]

Joseph Johnson wrote in 1808 that bleeding was said to be injurious in the epidemic influenza by the country physicians[17] but was used to better advantage in Charleston. A bill of Dr. Stubbins Ffirth of Dorchester dated 1810 shows that he bled three patients six times altogether

[16] David Ramsay, *The History of South Carolina*, vol. II (Charleston, 1809), p. 539.
[17] Joseph Johnson, *Oration . . . before the Medical Society of South Carolina* (Charleston, 1808).

in a total of sixty-three visits.[18] In his thesis at Pennsylvania[19] in 1804 on the Malignant Fever, he had advocated various treatments—"Of these, the first to be used, and the best is bloodletting. This should always be used in the first stage of the disease, and in such quantities as the state of the patient may indicate: it may be drawn with a liberal hand, not confined to ounces but to pounds . . . ."

A bill of Dr. Edward H. Anderson[20] to the estate of Colonel John Chestnut of Camden for attendance on the Chestnut Negroes in 1817 indicates that 58 bleedings were done in one large plantation over the period of a year. William R. Waring,[21] a Pennsylvania graduate in 1813, reported from just across the river in Savannah that he started using bloodletting in the severe epidemic of yellow fever of 1819, but abandoned it as ineffectual; and J. L. E. W. Shecut,[22] a pupil of David Ramsay, writing in 1819 of the yellow fever of two years before in Charleston, said: "I have long since sheathed my lancet," and quoted Dr. Dancer as saying that in Jamaica venesection had not proven successful.

Although the violent measures advocated by Rush declined in popularity, bleeding continued to be a general practice over the world. In 1833 it was still in full swing. Broussais and Bouillard were its chief exponents. By the mid-nineteenth century mention of bleeding as a therapeutic measure became more and more infrequent in the text-books of the time, largely because of the doctrine and influence of Marshall Hall of England who at one time had been an enthusiastic bleeder but recanted his earlier views most emphatically. Hall's influence was strong on Pierre Louis in Paris, and Louis' influence was strong on the American medical students who frequented Paris at that period. It is likely that a sharp decline occurred in the American use of bloodletting at this time.

Dr. Samuel Henry Dickson of Charleston could say[23] in 1845: "I regard venaesection as by no means an essential, nay, nor even a general remedy in yellow fever," mentioning that one of his medical friends still used the lancet freely while another scarcely ever employed it.

Thus the use of bleeding continued to enjoy some popularity, but a diminishing one, until now the old practice is a relative rarity, accepted as useful in a very few conditions in disease.

[18] Ms. bill in possession of The Medical Society of South Carolina.

[19] Stubbins Ffirth, *A Treatise on Malignant Fever* . . . , (Philadelphia, 1804).

[20] Edward Anderson, ms. bill in South Caroliniana Library, Columbia, S. C.

[21] William R. Waring, *Report to the City Council of Savannah, On the Epidemic Disease of 1820* (Savannah, 1821).

[22] J. L. E. W. Shecut, *Shecut's Medical and Philosophical Essays* (Charleston, 1819), p. 128.

[23] Samuel Henry Dickson, *Essays on Pathology and Therapeutics* (Charleston, 1845).

THE MEDICAL PROFESSION IN EARLY VICTORIAN ENGLAND, AS DEPICTED IN THE NOVELS OF THE PERIOD (1840–1870)[1]

MYRON F. BRIGHTFIELD

On the lowest level of the healing art, in Early Victorian England, stood the surgeon-apothecary—increasingly known, after 1840, by the newer title of " medical practitioner."

This term is of comparatively modern date, and is applied to the Pariahs of the medical profession. Men who are compelled to unite the acquirements of a physician with those of a surgeon. . . . [I]mpossible to be worse remunerated than the medical practitioner. In a country where wealth is the sole standard of social position, and where talent is comparatively disregarded, the condition of the medical practitioner, and still more, the condition of his family, is far from enviable. He may enjoy the confidence of his patients; he may possibly be admitted to the tables of the higher classes in the neighbourhood; but his family holds an uncertain and slippery position, the most trying to the manner and teasing to the temper that can be conceived. No gentleman ought to enter this profession.[2]

On his shoulders rested the routine business of the profession; he it was who " brought scores of matrons through their confinements, vaccinated hundreds of infants, drew countless teeth, and physicked, cupped, bled, blistered, and clystered generations upon generations." [3] He often kept an apothecary's shop, though he usually tried to disguise its character so as to escape the stigma of being classed as a tradesman.

[I]t would be disrespectful to designate the dispensary of Mr. Mainwaring, the medical general practitioner, by such a name, although there were certain boxes labelled cigars, and divers bottles containing a deep rose-coloured fluid closely resembling hair-oil to be seen in it. Other articles, also generally considered unconnected with medicine, such as tooth-brushes, hair-brushes, scented soap, and pomatum, were sold by him; but as these are all more or less connected with the hygiene of the body, it would be uncharitable not to consider them as *materia medica*.[4]

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[1] The reader will observe that this paper is composed of excerpts from novels published in England between 1840 and 1870 (of which I have read two thousand). I have tried to add as little as possible of my own commentary to the account presented by the passages themselves. Moreover, by omitting any introductory statement, I have endeavored to bring the reader immediately into contemporaneous contact with the age.

[2] Ellen Wallace, *Mr. Warenne, the Medical Practitioner* (1848) (London, 1848), I, 11 f.

[3] John Mills, *The Belle of the Village* (1852) (London, 1852), I, 28.

[4] William Gilbert, *The Goldsworthy Family* (1864) (London, 1864), I, 3.

Qualified physicians, who could properly employ the title of "doctor," were of a much more respectable class. Small towns, however, seemed occasionally to produce a shabby variety of them.

A thin, gaunt, hard-looking man with wiry, iron-grey short-cut hair; with high cheek-bones, and little scraps of whiskers sprouting on their summits. Untidily dressed, a crumpled white cravat twisted round his neck, long cuffs to his coat—when he turned these back, a severe "operation" sort of look was given to his long, sallow, nervous hands—a heavy watch-chain swinging from his fob.[5]

Examples of this vulgar order were to be found even in London.

Light-complexioned, thin-faced, and ginger-whiskered was Mr. Mellidew, with fluffy colourless hair that stood up in tufts and spikes on his head; he had large ears, which the wind caught and reddened angrily; he had a white tie which was draggle-ended; and his shirt-front had a knack of becoming unbuttoned and disclosing a chest-protector—for Mr. Mellidew's lungs were delicate; he wore a heavy cheap hat, which was brown with many showers, and always contained a stethoscope; he encased his feet in clumsy half-wellingtons, which were patched and mended until they had lost all semblance of their original shape; he carried an alpaca umbrella (popularly supposed not to open); and there was generally a button or so missing from his waistcoat, and an obtrusive pin or two visible here and there about his garments.[6]

More often, however, the qualified member of the profession was better-dressed and softer-mannered; he was most successful, perhaps, when he conformed to a type.

The doctor bowed. If the expression may be pardoned, he was one of those carefully constructed physicians in whom the public—especially the female public—implicitly trust. He had the necessary bald head, the necessary double eyeglass, the necessary black clothes, and the necessary blandness of manner, all complete. His voice was soothing, his ways were deliberate, his smile was confidential.[7]

In large cities, the medical ranks included members with prolonged training and true gentility.

Dr. Rane was a gentlemanly man of middle height and slender frame, his age about thirty. The face in its small regular features might have been held to possess a dash of effeminacy, but for the resolute character of the firm mouth and the pointed chin. His eyes—rather too close together—whiskers and hair were of a reddish brown, the latter worn brushed aside from the forehead; his teeth were white and even. Althogether a good-looking man; but one of rather too silent manners, of too inscrutable a countenance, to be very pleasing.[8]

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[5] Edward Dutton Cook, *Leo* (1863) (London, 1863), I, 148 f.

[6] Henry James Byron, *Paid in Full*, in *Temple Bar* (Apr. 1864-March, 1865), v. 13, p. 246.

[7] Wilkie Collins, *Armadale* (1866) (New York, 1874), p. 338.

[8] Mrs. Henry Wood, *Bessy Rane* (1870) (London, 1870), I, 3 f.

Dr. Rane had studied "in London, Paris, and Vienna. He passed all the examinations with great credit, including that in the College of Physicians." [9] It was London that supplied the supreme opportunity for the socially acceptable physician.

A serious illness in the royal nursery had brought George into consultation there, and with such fortunate results in the course that he pursued, that it caused no surprise amongst his colleagues when a graceful recognition of his services was made to him by the offer of a baronetcy.[10]

Such leaders of the profession (not yet, in the 'forties, definitely associated with Harley Street) were in continual requisition by the aristocracy.

Sir Benjamin Brodie was summoned from town, and held a consultation with Dr. Probehurt and Ellis.[11]

The family doctor's services were available by day or night.

Meantime the snow fell heavily outside, and wrapped everything in a soft and secret whiteness. And amid the whiteness and darkness, the lamp burned steadily outside at the garden gate, which pointed out the Doctor's door amid all the closed houses and dark garden walls in Grange Lane—a kind of visible succour and help always at hand for those who were suffering.[12]

His surgery was usually the back parlor of his dwelling place. To sit in the front parlor awaiting his summons was a severe ordeal for the patient.

The smell of jalap struck you upon the opening of the front door. . . . The front-parlour, or waiting-room, was a most depressing chamber, and was apparently furnished with a view to reducing the trembling patient to a condition of the most abject despondency. The engravings on the walls were mostly portraits of great doctors. John Hunter, with a severe expression, and a fly-blown frame; Abernethy, looking as seedy as the biscuits which bear his name; Doctor Sydenham, "the father of medicine," and who was apparently in deep grief concerning his offspring —frowned down upon the patient from their elevated but dusty situations. A melancholy bird, with a beak which must have rendered his life a burden, . . . stared with one pebble-eye glisteningly at the window—his other organ of vision had fallen out and been lost.[13]

The medical man of the 'forties believed that illnesses had to be fought vigorously.

[9] *Ibid.*, I, 117.
[10] Mrs. Jane Octavia Brookfield, *Only George* (1866) (London, 1866), II, 269.
[11] Francis E. Smedley, *Frank Fairlegh* (1850) (London, 1904), p. 223.
[12] Margaret Oliphant, *Miss Marjoribanks*, in *Blackwood's Magazine* (Feb. 1865-May, 1866), v. 99, p. 252.
[13] Byron, *Paid in Full* (1865), v. 13, p. 247.

Dr. Langton was a practitioner of the good old school; physicking and phlebotomizing, cauterizing and torturing, after the manner of his predecessor.[14]

A chest-burn, for example, called for strenuous exertions.

The medical man was called up, and immediately applied twenty-four leeches to Bohun's chest, and after that covered the whole scene of their operations with a large blister, which he finally dressed about six o'clock, and then left his patient to sleep and barley water, with an assistant to watch his pulse.[15]

However, the inevitable remedy for almost every kind of ailment in the 'forties was bleeding.

Having conferred together, both doctor and apothecary decided that the patient must lose blood, and a surgeon be instantly sent for.[16]

He came as quickly as possible, and by opening a vein relieved the oppression on the sufferer's brain.[17]

Phlebotomy, indeed, was credited with miraculous cures—although in the following instance the patient was afflicted only with a fainting spell brought on by the pain of a sprained ankle:

But when, after waiting for an awful interval of about twenty seconds, the blood actually welled forth, slowly at first, but then copiously, the miracle seemed completely accomplished in all ways; for the Baron soon opened the eyes that were supposed to be for ever closed in death, and, moreover, he heaved a gentle sigh.[18]

In the case of fevers, bleeding was often supplemented by further remedies.

The doctor arrived and declared congestion of the brain to be immanent, and proceeded at once to strong measures.[19]

In vain they tried their remedies: their ice to his head, their cooling medicines, their blisters to his feet.[20]

But fevers often puzzled the doctor.

"It's a fever," he said, "and a bad one; but I'm not a conjuror to tell what it is till it declares itself. It may be brain fever, it may be typhus, it may be rheumatic; I *think* it's nervous, but that is only a guess."[21]

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[14] Mrs. Matilda Houston, *Recommended to Mercy* (1862) (London, 1862), I, 43.
[15] Anonymous, *Maidenthorpe* (1861) (London, 1861), II, 220 f.
[16] Mrs. Catherine Gore, *The Dean's Daughter* (1853) (Leipzig, 1853), I, 181.
[17] Joseph Thomas Hewlett, *Parsons and Widows* (1844) (London, 1844), II, 75.
[18] Frances Trollope, *Second Love* (1851) (London, 1851), I, 293 f.
[19] Geraldine E. Jewsbury, *The Half-Sisters* (1848) (London, 1854), p. 237.
[20] Mrs. Henry Wood, *Mildred Arkell* (1865) (London, 1865), III, 305.
[21] Albany Fonblanque, *Cut Adrift* (1869) (London, 1869), II, 46.

Doctor Bertin himself could not tell how this queer illness might turn; such fevers were sometimes caused by mental disquietude, he said. Of infection, there was no fear; he came day after day, and stood pitifully by the bedside.[23]

"Heart disease" was also a baffling affliction.

Carefully divesting the subject of all professional technicalities, he told them that his patient was undoubtedly affected with serious disease of the heart. The exact nature of this disease he candidly acknowledged to be a matter of doubt, which various medical men might decide in various ways. According to the opinion which he himself formed from the symptoms, he believed that the patient's malady was connected with the artery which conveys blood directly from the heart through the system.[23]

The nervous system, too, might agitate itself in mysterious and fatal ways.

The doctor came and shook his head—"a thorough prostration of strength, occasioned by some great shock on the nerves"—and prescribed care and quiet, and mysterious medicines; but acknowledged that the result was doubtful, very doubtful.[24]

And poor Alice Helmsby was killed off by "a most severe attack of hysteria, complicated by spasms of the stomach."[25]

It was, seemingly, the mark of the inferior physician that—on those innumerable occasions when he could not identify the patient's malady—he confessed his ignorance.

Doctor Richard remained long silent. When he spoke at length, it was to say, "I am just as much puzzled as before."[26]

He might add the "assurance that no living man could tell for certain how things would be."[27] But the great London physicians, perhaps baffled just as often as their humbler colleagues were, established their superiority, apparently, by saying nothing.

On the third day a famous physician came down from London—a very stout and pompous gentleman, who saw the patient for about ten minutes, offered no particular opinion one way or the other, dined enormously, drank two bottles of old port, slept in the best bedroom, and went off next morning by the early coach with a fee of fifty guineas in his pocket and an air of the utmost condescension and unconcern.[28]

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[23] Anna Isabella Thackeray, *The Story of Elizabeth* (1863) (New York, 1863), p. 139.
[24] Wilkie Collins, *The Dead Secret* (1857) (London, n. d.), p. 266.
[25] Mrs. Elizabeth C. Gaskell, *Ruth* (1853) (London, 1906), p. 105.
[26] Jewsbury, *The Half-Sisters* (1848), p. 220.
[27] Julia Kavanagh, *Dora* (1868) (New York, 1868), p. 61.
[28] Edmund H. Yates, *Land at Last* (1866) (London, 1866), III, 129.
[23] Amelia B. Edwards, *Barbara's History* (1864) (Leipzig, 1864), I, 114.

Yet the result of the obstinate unwillingness of multitudes of sufferers to declare their symptoms in terms of recognizable maladies was that many of them appeared to die merely from an inability to remain alive.

He gave it as his opinion that there was no positive reason to expect a fatal termination—that there was no disease, but that she was in a state of weakness and depression which needed constant watching, or she would slip through their fingers.[79]

His disease was, as Mr. Phillips had said, a wasting away. The progress of the disease had been too great for any medical experience to deal with it. Yet his death was gentle and peaceful; day by day he dropped away.[80]

"You perceive," said the Doctor, in a deathbed voice, "coma has stopped the impulse to expire; therefore no blood has been arterialized."[81]

When the physician was called to examine a slender young woman who had for some time been vaguely ailing, it is difficult to see how there could have been any doubt about the diagnosis. She was the pitiful victim of "that luxurious feeder on youth and beauty, consumption."[82] Curiously enough, however, the doctors seemed either unable or unwilling to declare its presence.

[T]he doctor, when at last called in, had hesitated to pronounce upon the case as anything more serious than a low, intermittent fever, its accompanying symptoms of hectic and cough only symptomatic. What that meant neither Bessy nor her friends inquired. She was to live well—that they understood; and her medicine consisted chiefly of a plentiful supply of Peruvian bark, which she was to take in red wine.[83]

"To speak candidly, then," he answered, "though I hope we may effect her recovery in time, I fear there is a little tendency to disease, if disease has not actually taken place."[84]

He said the low state of energy in her spirits was letting the bodily organs go down like a watch unwound. He told me the act of living thus unsustained had already overwrought the lungs, and that whether the cause could be removed or not, they must breathe an air easier to be digested than that of our winter.[85]

[T]he result . . . is that he pronounces that there is nothing in particular the matter? that there is a little, perhaps—nervous—ar—ar—tendency to—ur—delicacy

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[79] Mrs. Matilda A. Mackarness, *Sibert's Wold* (1856) (Boston, 1856), p. 245.
[80] Lady Emily Ponsonby, *A Story of Two Cousins* (1868) (London, 1868), p. 280.
[81] L. S. Lavenu, *Erlesmere* (1856) (London, 1856), I, 93.
[82] James Anthony Froude, "The Spirit's Trials," in *Shadows of the Clouds* (1847) (London, 1847), p. 112.
[83] Mrs. Sarah Ellis, *Northern Roses* (1868) (London, 1868), III, 214 f.
[84] Morley Farrow, *Not Time's Fool* (1868) (London, 1868), I, 118.
[85] Caroline (Mrs. Archer) Clive, *John Greswold* (1864) (London, 1864), I, 78.

of constitution—ur—or rather, constitutional—of course exaggerated by!—ur—yes? circumstances!—or—ar—yes!—trying climates! No—immediate—to be anticipated! Care—perfect rest! avoid excitement!—or—yes! no strain upon the mind! —and—certainly no *immediate*—no! Certainly—yes.[86]

If the young sufferer had wealthy parents, she was eventually taken to Italy—where the truth might be learned from the Italian doctor.

"Her malady is incurable; it is what you English call consumption, decline. Your island, with all its blessings, has this great bane. She came here with the seeds of disease in her constitution, they were already springing into vitality; and our soft, genial clime may prolong yet a little longer, but cannot save her life."[87]

The doctor's patient was often judged to require the services of a nurse. In the days just before Miss Nightingale changed the character of the nurse's vocation, it was possible to encounter such a creature as Sarah Gamp.

She was a fat old woman, this Mrs. Gamp, with a husky voice and a moist eye, which she had a remarkable power of turning up, and only showing the white of. Having very little neck, it cost her some trouble to look over herself, if one may say so, at those to whom she talked. She wore a very rusty black gown, rather the worse for snuff, and a shawl and bonnet to correspond. . . . The face of Mrs. Gamp—the nose in particular—was somewhat red and swollen, and it was difficult to enjoy her society without becoming conscious of a smell of spirits.[88]

Her kind was not at all uncommon.

Mrs. Mottle was a slightly exaggerated specimen of the sisterhood tolerated in too indulgent English society under the misnomer of nurses: a class of women in the main fawning, selfish, and tyrannical, the bane of nurseries, and an added horror to the catalogue of miseries indigenous to the sick room.[89]

Since these harpies had received no kind of medical training, there was nothing to distinguish them from laundresses or charwomen.

This phenomenon announced herself to be Mrs. Runt, laundress, and invariably soiled every article with which she came in contact. She was always sipping half-pints of porter, and always talking with indecorous glibness about the "estate" and the assignees. In all the catastrophes of life—in childbirth, in bankruptcy, in captivity, in sickness, and in death—these appalling women start up unbidden, and have dominion almost as great as that claimed by commissioners, by turnkeys, and by undertakers.[90]

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[86] Louisa Jane Downes, *Thrice His* (1866) (London, 1866), II, 302 f.
[87] Emma Jane Worboise, *Thornycroft Hall* (1864) (London, 1864), p. 395.
[88] Charles Dickens, *Martin Chuzzlewit* (1843) (London, 1910), p. 302.
[89] Thomas Mackern, *Lucian Playfair* (1857) (London, 1857), I, 6.
[90] George Augustus Sala, *The Seven Sons of Mammon* (1862) (Boston, 1862), p. 176.

When the attending physician himself supplied the nurse, she was generally of a more acceptable variety.

> She was a respectable nurse of the soft sort—one of those bundles of shapeless clothes, with a middle-aged female inside the crust of the animated dumpling, who doze pleasantly in great chairs, and wake up periodically to administer medicine.[41]

> A tidy, motherly-looking woman came curtseying forward as the doctor left the room. She had a pleasant face, with kind, soft eyes, which took Ernestine's fancy at once.[42]

But the "ideal" nurse was indeed the rare exception.

> Small, spare, wiry, so upright as to occasion in the observant mind an idea of a permanent backboard concealed somewhere within or without her stays, with a strong tendency to bridle when speaking, which caused a sudden development of the muscles about the throat—not more than two-and-thirty, though looking considerably older—with light transparent eyes, and corkscrew ringlets that, although guiltless of curl-papers, were never out of curl—she was a prodigy of physical strength and moral firmness. No fatigue overcame her, no danger deprived her of her presence of mind. After a night of the most anxious watching, there she would be in the morning, her apron clean, herself fresh, alert, and ready to carry out any order of the doctor, however troublesome. Ceremoniously respectful in her manner, and grandiloquent in her language—seldom using an unfit expression, though occasionally an ungrammatical one—she was, as she would say of herself, *granite* with her patients in the enforcing of orders, but motherliness itself when they had duly submitted to them.
>
> Drinking water "upon principle," she yet made a point, and a strong point, of her tea; . . . and other stimulants she rigidly negatived. Scrupulously clean in her person and her habits, a stickler for the decorum and proprieties of the sick-room, piquing herself not a little on a character and a system of her own, diametrically opposed to those of nurses in general, whom she was wont to designate as "a shallow, illiterate set;" with some pride, more vanity, and most of all, candour in admitting her own faults—such was Mrs. Beddoes, than whom I never met with a trustier nurse or more conscientious Christian.[43]

There could be little wonder that large numbers of Early Victorians, observing, in the 'forties, the negative consequences of the physician's ministrations on the many illnesses of mankind—were moved to conclude that "but little actual good in the aggregate has resulted, if humanity knew the truth, from the whole faculty of medicine throughout the

[41] John B. Harwood, *Lady Flavia*, in *Chambers's Journal* (Jan. 5-July 27, 1865), v. 42, p. 139.

[42] Felicia Mary Skene, *Hidden Depths* (1866) (Edinburgh, 1866), I, 183.

[43] Caroline L. Gascoigne, *Doctor Harold* (1866) (London, 1866), I, 60 f.

world." [44] Some of these sceptics granted that the doctor usually failed to receive credit for the arduous, if futile, exertions he made.

His broken rest, long rides or drives through darkness, rain, and snow, and searching winds, are counted as nothing. His earnest watchings of every phase of varying disease, his noble courage, which faces contagion in all its dreadful forms; his patient bearing towards all, and the exercise of skill and knowledge, acquired by years of study and astute observation, are disregarded by too many, and would go unrewarded if the doctor could feed of the chameleon's dish, and would be content to do so.[45]

Still other observers conceded that the family doctor might be valued mainly, if not entirely, for the social service he performed.

It is not only for the sick man, it is for the sick man's friends, that the doctor comes. His presence is often as good for them as for the patient, and they long for him yet more eagerly. How we have all watched after him! what an emotion the thrill of his carriage-wheels in the street, and at length at the door, has made us feel! How we hang upon his words, and what a comfort we get from a smile or two, if he can vouchsafe that sunshine to lighten our darkness! [46]

The patient's ego gained pleasant stimulation and relief through its uninhibited utterances to this lay confessor.

Then there is the arrival of the doctor (the grand event in our day), who comes —sits beside us—encourages us to complain, and listens. Oh, what can equal the blandness and sympathy of a listening doctor! We detail our minutest sensations with a modest pride at possessing so many indisputable claims on his attention.[47]

Indeed, the experienced physician viewed his professional practice in this social light.

He was accustomed to make a three-fold division among his patients, and to class his visits to them under three heads—necessity, sympathy, and form. Among these the visits of necessity were of course the most important; they constituted a class of many gradations, including all who could possibly derive any benefit from his skill, whether in the way of alleviation or of real cure. The visits of sympathy were paid to sufferers whom he could not help, but who were comforted by his presence, and by the privilege of telling out all their troubles to an unwearied and understanding ear. He was very scrupulous about these visits, never omitting and never hurrying them; but saying to himself, with a sigh, as he faced the inevitable pain, "Well! it's all I can do for them." Last on his list, but perhaps most numerous, came what he called the visits of form. The receivers of these were the patients who could, he believed in his heart, have done perfectly well without him; but whom

[44] Kinahan Cornwallis, *Howard Plunkett* (1857) (London, 1857), I, 91.
[45] Mark Lemon, *Loved at Last* (1864) (Leipzig, 1865), I, 8 f.
[46] W. M. Thackeray, *Pendennis* (1850) (New York, 1906), p. 623.
[47] Geraldine E. Jewsbury, *Zoe* (1845) (London, 1853), II, 43.

it was nevertheless his duty to see and prescribe for, because they imperatively demanded it.[48]

The patient who had been led by his experiences to renounce all regular practitioners, or "allopathists," might seek the homeopathist—the disciple of the new German doctrine

. . . lately risen on the horizon, of which Samuel Hahnemann is the apostle. He lives, as I understand, in a very simple way, surrounded by a devoted band of disciples, with whom he carries out a series of experiments on the pure influence of drugs upon the healthy body, in the conviction that thereby the clue can be obtained to the action of medicines in disease.[49]

Hahnemann

. . . found revealed to him that the influence which plants, minerals, and animal secretions exercise over disease is dependent on the law which declares that, from all time, *similia similibus curantur*. All treatment of disease external to this everlasting law is blind and senseless empiricism.[50]

Homeopathic doctors, with their minute doses, practised in considerable numbers throughout the country, and even an occasional allopathist was won over.

Believing that a large portion of Belgravia was sufficiently enlightened to receive the new philosophical discovery that an infinitesimal quantity of poison would produce quite as beneficial effect on the physical system as a bread pill, and a greater effect on the imagination, Sir John had nobly sacrificed his prejudices without much detriment to his patients or any to his practice.[51]

Among the lower orders the ministrations of a physician were seldom solicited. In the country districts, old women still made poultices of herbs.

He had often heard of the filthy remedies commonly employed in the country places in the cure of various diseases, but his imagination never conceived such a loathesome sight as that displayed by the sufferer when she removed her bandages.[52]

In the towns the women consulted the medical manuals designed for family use—"the 'Buchans,' 'Reeces,' and 'Grahams,' whose 'Medicine Made Easy' have long been the solace of many an ailing and apprehensive female."[53] The Early Victorian populace also dosed itself with patent nostrums.

[48] Menella B. Smedley, *A Mere Story* (1865) (London, 1865), II, 37 f.
[49] Mackern, *Lucian Playfair* (1857), I, 88.
[50] *Ibid.*, I, 254.
[51] Thomas Solly, *The Campbells* (1859) (London, 1859), II, 14 f.
[52] Mrs. Starbuck, *A Woman Against the World* (1864) (London, 1864), III, 238.
[53] Houstoun, *Recommended to Mercy* (1862), I, 48.

"I know that the Cathartic Pills are a drastic compound which may be as bad as poison to half the people who swallow them; that the Elixir is an absurd farrago of a dozen incompatible things; and that the Cancer Cure might as well be bottled ditch-water."[54]

There was abundant profit to be made by concocting a violent purgative—like the "Peristaltic Persuaders":

A well-mixed compound of cheap purgatives, they could not fail to make an impression on the people who took them, and will do so while the drastic power remains in aloes and gamboge, while colocynth is a constipation-compeller, and jalap no joke in scruple doses. So the fame of the physic, fungus-like, sprung up suddenly, and the fortunes of the proprietors were already an accomplished fact, simply an affair of time.[55]

Soothing syrups containing opium were in the same profitable category—like "Child's Peace," which came in

. . . a plethoric green bottle, containing the lauded laudanum in disguise; forth it came, glorified by an emblematical label, addressing society in general, mothers and nurses in particular, to the effect that the invaluable compound it contained was the result of a life-long, laborious, and expensive research into the vegetable kingdom of nature; its discoverer, one of the unrecognized benefactors of mankind, had terminated his labours only with his life; and the prescription was the sole legacy remaining to his large orphaned family, for whose sole benefit and support it was now vended, retail and wholesale, at the "Peace" warehouse, and by all respectable chemists and druggists throughout the United Kingdom of Great Britain and Ireland; that it sold for 2s. 9d., 4s. 6d., 11s., and 32s. the bottle; the largest the cheapest; foundling hospitals and orphan asylums allowed twenty-five per cent.[56]

As if instilled with the specific intention of flouting the animadversions of the sceptics, the profession of medicine entered, in the 'fifties and 'sixties, a period of rapid advance and solid achievement.

Ether was used as a general anaesthetic in 1846 in Boston, Massachusetts. But the British preferred chloroform, which was first employed by Simpson of Edinburgh in November, 1847. It was reported that, during several subsequent years, "medical men were chary of incurring the responsibility of employing it."[57] Popular fears, too, were aroused by the occasional behavior of patients under its influence.

[54] George Eliot, *Felix Holt* (1866) (New York, n. d.), p. 56.
[55] Mackern, *Lucian Playfair* (1857), III, 8 f.
[56] *Ibid.*, I, 13 f.
[57] Anne Beale, *Nothing Venture, Nothing Have* (1864) (London, 1864), II, 275.

The faint moaning of the invalid during the whole period of the operation conveyed the idea that he was suffering keenly, though to the matured experience of the operator it was but the natural effect of the sleep into which he was thrown.[58]

Before the days of chloroform, the success of an operation depended on the speed of the surgeon and the stoicism of the patient.

So saying, Jones found it most advisable to take off the hand an inch or two above the wrist joint, so great was the injury his patient had sustained. He dissected off a piece of the skin, partly from the back of the wounded hand and wrist, the most painful part of the operation, in order to form a flap to cover the amputated stump. Wilkins, drawing that back, and the fleshy part beneath, and gripping both fast, the wounded man changed colour a little, but not a muscle of his face moved; he had called up all his resolution, and it was the victor. Jones then, in the twinkling of an eye, ran his keen knife continuously through the flesh and round the limb into the bone, and then with his sharp saw separated the diseased from the sound part by two or three movements. No groan was heard. A few bloodvessels were hooked and tied up, the flap of skin brought down, and the whole secured with adhesive plaster—in short, the operation was completed, and the wounded arm placed in a sling.

The sufferer had not spoken, he now essayed to speak, and a deep pallor overspread his countenance; the reaction after his manly resistance to pain during the operation was accompanied with a faintness he could not control. A cordial was given to him, and he was advised to throw himself on his bed.[59]

But when patients were completely insensible under the anaesthetic, such amputations could be performed with careful and deliberate techniques.

Presently it was proposed that they should adjourn to the place of operation. This was a very small theatre, with a strong and awful-looking table in the centre, around which the seats arose very precipitously. It was lighted from above. . . .

It was speedily announced that Sir Scalpel Slasher's carriage was at the door, and orders were given to bring down the patient. In a few moments a pallid-looking being, with a blanket thrown over him, and his eyes blindfolded, was borne carefully in and placed upon the table. While the spectators were watching him, a slightly-built man in black, with his coat buttoned close up to his chin, entered from a side-door, and gave a keen glance at the patient. Cold blue eyes, an aquiline nose, compressed lips, and a decided manner, afforded at first an impression that a stern man stood before you; but a second look showed you that there was benevolence in the face, and some quietly given directions for the greater comfort of the patient confirmed the conviction. . . .

A nod from Sir Scalpel, and the stupifying process began. In what seemed to Philip a very short time, one of the surgeons at the patient's head gently forced open an eye of the latter, who had sunk into repose, and was far away in his native country, carousing with old schoolmates, and roughly courting the Phyllis of his

[58] Anonymous, *Rose Aylmer's Home* (1865) (London, 1865), I, 201.
[59] Cyrus Redding, *A Wife and Not a Wife* (1867) (London, 1867), II, 200 f.

youth. The nod was returned by this gentleman, and Sir Scalpel, knife in hand, advanced to the table.[60]

A keen bright flash of the blade in the softened light, and the surgeon thoughtfully describing an imaginary curve in the air with the point just above the insensible patient; then, with a satisfied nod, he leaned forward. There was once more a bright flash of the knife, followed by a bold, firmly-directed cut deep and long, but clear of the vital parts in the wondrous organization. Then came the spouting gush from many a vessel as the old man's life-blood rushed from its maze; busy fingers at work, here upon arteries to stay their waste, there applying sponge; one blade changed for another, more manipulation, and orders performed after being given in a calm impressive whisper; a few more busy moments, and the throbbing flow of life arrested; rapidly-moving fingers with sponges, silk, strapping, towels; and the great surgeon softly wiping his hands, cool, calm, and unruffled.[61]

Having quickly proved its worth, chloroform was soon widely and regularly administered.

Mr. Weston appeared, with an instrument very like a flatiron hollow at the bottom. This cavity was just fitted to receive the patient's nose and mouth; the chloroform was poured in at an orifice in the handle, and in a few seconds began to take effect.[62]

He lay here one day when the doctors came down from London. And one of them put a handkerchief over his face, which smelt like chemical experiments, and somehow reminded him of Dr. Daubeny. And he fell asleep; and when he awoke, he was suffering pain in his left arm—not the old dull grinding pain, but sharper; which gradually grew less as he lay and watched the weirs at Casterton. They had removed the splinters of bone from his arm.[63]

It was sometimes given to the fatally injured.

Chloroform was administered, which, if it could accomplish nothing towards prolonging that valuable life, might at least assuage the torments of the parting hour.[64]

Just before 1860, however, a much superior pain-killer was introduced:

. . . the subtle spirit that lurks in the sleep-supplying poppy; not the gross ruby-visaged laudanum, but its inner self, its essential principle, the pale potent morphia, that wondrous alkaloid.[65]

The next subsequent step in medical progress—antiseptic surgery—may be said to date from 1867, when Joseph Lister published an account of his experiments with phenol. The most advanced physicians, thereupon, attempted to create an antiseptic atmosphere in and about their surgeries.

[60] Shirley Brooks, *The Gordian Knot* (1868) (London, 1868), pp. 211 f.
[61] George M. Fenn, *Mad* (1868) (London, 1868), II, 275 f.
[62] Mary Molesworth, *The Great Experiment* (1860) (London, 1860), II, 309.
[63] Henry Kingsley, *Ravenshoe* (1861) (London, n. d.), pp. 398 f.
[64] Mrs. Gore, *The Dean's Daughter* (1853), II, 315.
[65] Mackern, *Lucian Playfair* (1857), II, 308.

She found a wet sheet flapping in the gray anteroom . . . which Dr. Rane had saturated with disinfecting fluid. Jars of disinfectants stood on the wide landing, on the staircase, and in other parts of the house.[66]

In the 'fifties and 'sixties, moreover, the violent bleeding, blistering, and physicking gradually disappeared. In particular, the greatly lessened employment of the lancet saved many lives—and various physicians were credited with the innovation.

The judge put in a few intelligent questions after counsel had done, and surprised all the doctors in court with these words: "I am aware, sir, that you [Dr. Sampson] were the main instrument in putting down blood-letting in this country."

Some doctors were reluctant to give up the practice.

"A little blood-letting might, if taken at the exact moment, . . . have been of some use. There's a prejudice just now against the use of the lancet, I know; but still ——."[68]

But in the 'sixties, generally speaking, only of the French doctors could it be said: "They are very free with the lancet—with leeches—with anything else that draws blood."[69]

Thus physicians adopted milder measures. They gained more awareness of the periods of incubation and duration of diseases; they were less anxious to "reduce the symptoms"; they employed drugs mainly to maintain the patient's natural resistance. The bedside technique became much more "modern":

He saw his patient, felt her pulse, studying the while his gold repeater, and when satisfied he dropped the little wrist on the bed-clothes and the repeater into his pocket at one and the same moment. He then examined Kathy's tongue; that done he rubbed his dapper hands together, stroked his clean-shaven chin, adjusted his white neck-cloth, and intimated that, if Mrs. Hagart would attend him, he would write out a prescription.[70]

A valuable instrument of diagnosis also aided the gentler methods.

"We then got her to bed. Mr. Goodricke went away to his house for medicine, and came back in a quarter of an hour or less. Besides the medicine he brought a bit of hollow mahogany wood with him, shaped like a kind of trumpet; and after

[66] Mrs. Henry Wood, *Bessy Rane* (1870), II, 211.

[67] Charles Reade, *Hard Cash* (1863) (Philadelphia, n. d.), p. 444. Actually, most of the credit belonged to John Hughes Bennett's *Clinical Lectures on the Principles and Practice of Medicine* (1859).

[68] Edmund H. Yates, *The Rock Ahead* (1868) (London, 1868), I, 38.

[69] Mrs. Henry Wood, *St. Martin's Eve* (1866) (London, 1932), p. 335.

[70] Alexander Smith, *Alfred Hagart's Household* (1865) (Boston, 1865), p. 114.

waiting a little while, he put one end over the lady's heart and the other to his ear, and listened carefully." [71]

It quickly entered into general clinical use.

He took his stethoscope out, applied it to the chest of the patient, and for some minutes seemed to be looking with his ear through a sort of telescope.[72]

She had barely recovered from her surprise when she found herself persuaded to lay aside her mantle and undo the upper portion of her dress; and in another moment the doctor had his stethoscope at his ear, and was listening to her inspiration as he instructed her to assume different positions, and to draw her breath in various ways.[73]

There were even doctors, apparently, who employed no other medical agency. There was, for instance, Dr. Prater—

. . . sitting behind a leather-covered table on which a stethoscope was conspicuously displayed, and who, after sounding the chests of consumptive curates or struggling clerks, would say, with an air of blandness dashed with sorrow, "I'm afraid the proverbially treacherous air of our climate will not do for us, my dear sir! I'm afraid we must spend our winter at Madeira, or at least at Pau. *Good* day to you." [74]

Despite all these marked advances, the medical profession had not, in the 'sixties, achieved a status beyond cavil. There was still one supreme remedy for compound fractures.

The bone had protruded through the skin in the first instance, and left a wound. This wound, instead of healing, began after a few days to look angry, and the fevered state of the patient's blood, brought on by his mental and bodily irritation, added fuel to the fire. The doctor looked grave, and watched it with unremitting attention, but at last concealment and silence were out of the question. He gave it as his opinion that all had now been done that could be done, and one closing effort of surgical skill was all that remained to be attempted, and that was—amputation! [75]

To remove alien growths from the body cavity itself was still largely regarded as beyond surgical achievement.

"It is an inward tumour," said Mr. Rubb, "and has troubled him long, though he has said nothing about it. It is now breaking, and the doctor says he can't live." [76]

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[71] Wilkie Collins, *The Woman in White* (1860) (New York, n. d.), pp. 391 f.

[72] Percy H. Fitzgerald, *Bella Donna*, in *Dublin University Magazine* (March-Dec. 1863), v. 62, p. 107.

[73] Edward Bradley, *Mattins and Mutton's* (1866) (London, 1866), I, 124.

[74] Edmund H. Yates, *Broken to Harness* (1864) (New York, n. d.), p. 179.

[75] Lady Harriet Anne Scott, *The Pride of Life* (1854) (Philadelphia, n. d.), p. 370.

[76] Anthony Trollope, *Miss Mackenzie* (1865) (London, 1924), p. 177.

And certainly, outside the field of surgery there yet existed ample ground for popular cynicism.

"It strikes me forcibly, Tom, that medical science is one of the things that makes little progress, considering all the advantages of our century. I don't mean to say that they don't know better what's inside of you, what your bones are made of, that they haven't more hard names for everything than formerly; but that when it comes to cure you of a toothache, or a colic, or a fit of the gout, my sure belief is they made just as good a hand of it two hundred years ago. I won't deny that they'll whip off your leg, tie one of your arteries, or take your hip out of the socket quicker than they used long ago."[77]

The Early Victorian doctor, it is true, was obliged to watch the familiar diseases proceed in their same old unhindered ways. How could his stock of medicaments combat the normal manifestations of the English climate?

The snow which for more than three weeks had covered the ground, was now giving way under the influence of a heavy rain and a milder thaw. But the atmosphere, as is always the case in a thaw, was to the sensation colder than during the long-continued frost. The air was loaded with damp vapours which hung over the earth, and made respiration a pain. Then came down upon the kingdom the sweeping influenza with all its symptoms—fever, cough, depressing weakness, rapid inflammation, unexpected death. It spread through the land in all directions, mowing down old and young, prostrating whole families at once, and decimating the population of many crowded towns.[78]

How could his professional knowledge conquer the deadly pulmonary afflictions?

Emily, on her arrival at home, went at once to her own chamber, and divesting herself as rapidly as she could of her dripping garments, proceeded in all haste to apparel herself anew. When her toilette was complete, she felt so chilly that she was glad to hasten downstairs, and seat herself in a snug corner of the fire-side; but even there she shivered from time to time, and before long began to feel strange pains in her head and limbs; but, exerting herself to the utmost, she succeeded in concealing her growing indisposition, and, busy with a piece of fine needlework, sat chatting with Mrs. Gilbert till the afternoon was far advanced. At length, however, she found herself forced to yield to the sense of increasing illness. Her fevered hands became almost powerless, and her parched lips could scarcely utter a word. Pleading a headache, she retired to her chamber, and wrapping herself in a warm shawl, lay down on her bed.[79]

The physician also faced certain undeniable facts of Early Victorian hygiene. In the first place, Englishmen were not conspicuous for bodily cleanliness.

[77] Charles James Lever, *The Dodd Family Abroad* (1852) (London, n. d.), I, 63.
[78] Mrs. J. Hubback, *The Stage and the Company* (1858) (London, 1858), I, 243 f.
[79] Julia Day, *The Gilberts and Their Guests* (1858) (London, 1858), II, 243 f.

It is really astonishing to me that so many of my countrymen shun the luxury of a bath as cautiously as they would do, were they manufactured of loaf-sugar, or any other soluble article. They never cleanse the surface of their bodies, excepting the epidermis of their hands and face, and then wonder that they suffer from indigestion, irritability of the nervous system, and other ills that flesh is heir to, when the pores of the body are clogged, and unable to perform their functions properly. Truly, we are a filthy nation in this respect.[80]

The impact of a Turkish bath on a laborer, with his many years' accumulation of ingrained dirt, was indeed a shattering experience.

"So I went into t'bath-house, and they put me into a room that was ever so hot. It made one feel queerish, but I wasn't afeared. I hadn't got my clothes on, begging your pardon, miss, for saying so, and I tuk a chair nigh hand t'stove; for, says I, if t'heat's to do one good, t'hotter t'better. Well, it was warmish, I will assure you, and I brak out in such a sweat that when I rubbed my hand down my legs it fair went in a slush on to t'floor. I stopped half an hour, until I sat in a pool, and it wasn't as clean as I could ha' liked it to be; it a'most seemed as if it fetched t'dirt out o' my very bones. Then they telled me to come out, and I went to where it was fresher, and I sat me down again, and cold watter came all over me, and then they rubbed me, and then more watter cam. Oh, it made me feel pure! Then I had to bide still for a time, and after that I comed away; and, if you'll believe me, miss, and you, sir, t'pain was clean gone out o' my knees."[81]

Again, there was very little popular respect for fresh air—although young people attempted occasionally to encourage it. Thus, at a ball, with the air filled with the heavy odor of flowers—

Some one—a young person—opens a window, and some one—an old person, Lady Lancaster, I think it is— shuts it again. Lady Lancaster has that rooted aversion to fresh air which characterized the last generation.[82]

The air inside most houses remained fairly stationary.

The housemaids would be astir about seven, flitting about the house as restless as bats, and about as useful, sweeping dust from one stair to another, and finally into a cupboard. . . . Then the dust that they raise, where does it go to? Out of the windows it is to be hoped, if the windows are open; but if they are not, on to the sofas, behind the chairs, under the cabinets, and up on their tops. You can lay a ghost, I have heard, once for all, . . . but the ghost of the dust in a London house is only laid every day to rise again the next morning.[83]

Moreover, Early Victorians regularly slept in unventilated cubicles.

[80] Hewlett, *Parsons and Widows* (1844), II, 15 f.
[81] Anonymous, *Rose Aylmer's Home* (1865), II, 36 f.
[82] Rhoda Broughton, *Cometh Up as a Flower* (1867) (London, 1899), p. 257.
[83] George W. Dasent, *Annals of an Eventful Life* (1870) (London, 1870), I, 336.

Orelia . . . inhabited a large square four-poster with a heavy carved tester, and curtains which she would let down all round her at night, and become invisible as the man in a Punch's show.[84]

And outside air was customarily excluded from the bedroom during the night.

At nine o'clock a miniature lady's maid . . . enters Helen's bed-room to summon her to rise. The little damsel is sure to receive an affectionate greeting from her young mistress, and a request to draw the curtains from the windows, and then open the windows themselves, so as to admit the summer air.[85]

The fact that multitudes of Early Victorians ate themselves into early graves was not unknown to their physicians.

"It is, I own, difficult to define the limit, though I expect the number of deaths produced by voluntary starvation would hardly equal those produced by intemperance. There can be, I think, no doubt of the benefit to be derived from fasting."[86]

Examples of gourmandism were universally evident.

Mr. Clifton, like many other gentlemen immersed in business, was in the habit of fasting all the day, and returning late to eat a hearty dinner—at which he sometimes did eat rather more than inclination dictated, on the principle that, having fasted so long, he must make up for it by double duty at his own table. Mrs. Clifton held the same opinion, and if anything could be got to tempt his appetite, or to awaken an agreeable surprise, under which he might be induced to eat a little more than usual, both were of opinion that a great good had been attained, and the experiment was tried again with renewed assiduity. In process of time artificial aids were resorted to. Popular pills, of infinite variety, were taken; but still Mr. Clifton did not feel himself quite the thing. In fact, a sort of vertigo frequently attacked him when stooping or turning quickly round. This was said to arise out of sheer weakness; he wanted more support, more nourishment must be got into the system.[87]

In these circumstances it had often to be sadly recorded—"He turned blue at the second course of dinner one day, and expired forthwith, without waiting for the conclusion of the repast."[88] Despite such grim warnings, however, the doctor's remonstrances were not ordinarily received in an accommodating spirit.

"You'd like me to live sparingly—to starve myself, in short—and you'd like me to take exercise!" returned Mrs. Verner. "Wouldn't you now?"

"It would add ten years to your life," said Jan.[89]

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[84] Edward B. Hamley, *Lady Lee's Widowhood* (1854) (Edinburgh, 1854), I, 9.

[85] John Cordy Jeaffreson, *Hinchbrook*, in *Fraser's Magazine* (Feb.-Oct. 1855), v. 51, p. 234.

[86] Henry John Coke, *High and Low* (1854) (London, 1854), I, 240 f.

[87] Mrs. Sarah Ellis, *The Mother's Mistake* (1856) (London, n. d.), p. 26.

[88] John Cordy Jeaffreson, *Crewe-Rise* (1854) (London, 1854), I, 222 f.

[89] Mrs. Henry Wood, *Verner's Pride* (1863) (Leipzig, 1863), I, 296.

Admittedly, it was scarcely possible for women to engage in any genuine exercise.

Then she took a walk in the garden, to while away the tedious hours of time, and wondered why, on ascending the steps of the terrace, she was so breathless. She must have buckled her corset too tightly that morning, she thought, in the hurry of her dressing.[90]

Against this magnificently favorable background of dust- and pollen-filled air, overbreathed rooms, infected food and water, over-eating, lack of exercise, and over-corseted women—the majestic Early Victorian headache flourished luxuriously.

Slowly and languidly Emma rose from her bed; her head ached so intensely that she could scarcely raise her eyes; an iron band appeared to be compressing her forehead, and seemed every moment to increase in pressure. She tried to arrange her hair, and her dress, disordered by lying on the bed, but felt incapable of the exertion.[91]

The problem was usually not how to escape it, but how to bear its practically unremitting visitations stoically.

You learn, under daily, hourly headache to move, think, speak, bear noise, listen to practising, understand questions, return intelligible answers, and do all kinds of things, with a certain dulled sense of suffering, inconceivable to those who have a mere passing acquaintance with headache—temporary headache—headache now and then.[92]

One's sympathy goes out readily to the sufferer—but also, scarcely less readily, to the physician who was summoned with the expectation that he could effect a cure.

She was suffering terribly, poor girl; suffering from one of those agonising mutinies in the head, when all the nerves are rising up in array against each other—when thought, and sound, and light, one and all affect the sufferer to an equal degree, and set all the head machinery scrunching one part against the other—when a specially lively demon seems to seat himself upon the bundle of nerves on the left temple, and hammers away with both feet upon some very sensitive strings that run from that place to just behind the eyes—when the brain seems to be pressing forward, and there is a great feeling of pulpiness at the back of the head—when meaningless words repeat themselves unceasingly, and lines of poetry, that have no special application to anything on earth, insist on being pronounced with emphasis—when, in fact, it is just touch and go between temporary insanity and permanent madness, and one can feel nothing but pain.[93]

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[90] Lady Emma Lennard, *Constance Rivers* (1867) (London, 1867), III, 126.
[91] Mrs. J. Hubback, *The Younger Sister* (1850) (London, 1850), III, 62.
[92] Mary Cowden Clarke, *The Iron Cousin* (1854) (New York, 1857), p. 109.
[93] Annie Thomas, *Walter Goring* (1866) (Leipzig), II, 72 f.

THE YEAR VIRGINIA MOURNED: THE SOURCES FOR A CATASTROPHE

GORDON W. JONES

The traditional Virginia hospitality and kindness of Norfolk backfired in the summer of 1855 into one of the colossal public health blunders of the century. A hundred years and three great wars have nearly obliterated the memory of an epidemic which, proportionately, was worse than the London plague of 1665.

It all started when the *Ben Franklin*, a steamer fresh from yellow-fever-ridden St. Thomas, arrived in Norfolk's harbor in distress. Her captain begged permission to dock her for repairs. Despite rumors of clandestine burials from his ship and sinister reports of a corpse with orange-hued hands which had washed up on the beach,[1] the over-shrewd captain blandly denied that there was any yellow fever on his ship. Richard Henry Dana, Jr., would have recognized that captain!

Finally, after a little half-hearted quarantine delay during which two terrified passengers swam to shore from the *Ben Franklin*, the inconceivably good-natured health authorities allowed the ship to dock at Gosport on condition that her hold not be broken open.

Even this pointless agreement was broken by the skipper. In a few days people were fleeing the area of the docks because of a small outbreak of yellow fever. The entire month of July passed with only a slow increase in the incidence. The environment was becoming infected.

A few wise and timid souls fled in July. More fled with the terrifying spread in August—some of these too late. But the appalling toll of the pestilence struck in early September and continued in October. All commerce stopped. The one industry became that of fighting yellow fever. Heroic political leaders, ministers, and physicians of Portsmouth and Norfolk, "the twin cities of plenty and happiness," worked and died at their posts.

Likewise, the newspapers stuck to their task as long as they could. *The*

[1] William S. Forrest: *The Great Pestilence in Virginia*; being an historical account of the origin, general character and ravages of the yellow fever in Norfolk and Portsmouth in 1855. New York: Derby and Jackson, 1856, p. 14. This is the commonest account of the epidemic, six copies having been located. Location symbols in this paper will be as follows: Library of Congress, LC; Alderman Library of the University of Virginia, VaU; Virginia Historical Society, VaH; Virginia State Library, VaS; Personal library, P.

Daily Southern Argus, which held out the longest, finally suspended publication in September, 1855 because the epidemic had left only one man in the plant. On its resumption on October 15, the editor wrote, "How doth the city sit solitary that was full of people! How is she become as a widow . . . we today resume our labors suspended since 5 September."

"How is she become as a widow." Norfolk and Portsmouth were stunned to paralysis. The entire remainder of the Chesapeake Bay area (and beyond), which had first recoiled in horror and invoked harsh quarantines in fear of the contagion, soon had resolved in pity and had poured forth money, goods, and volunteers in typical American fashion.

Considering the fact that both Norfolk and Portsmouth were then small towns, we have available a surprisingly rich body of source material for the epidemic. A study of it is a breathless experience.

Our first glimpses of the trouble, of course, are in the newspapers.[2] *The Daily Southern Argus* practically ignored the disease until July 25, 1855, when it reassured its readers that nothing much was going on. However, two days later, it felt impelled to ". . . state again that Norfolk is exceedingly healthful . . . no yellow fever or other contagious disease and we see no cause for alarm."

[2] Newspapers. The collection of this material at the Library of Congress is vast, but by no means complete. The paper quoted at length in the body of this article was not the only Norfolk paper. We learn about two of them from The *Daily National Intelligencer* of Washington: The Norfolk *Bulletin* suspended publication on August 11, the day before two hundred prominent families of the two cities fled on the steamer *Georgia* for Baltimore. The *Norfolk Herald* continued until August 24. Thus, the *Daily Southern Argus* was either the pluckiest or the luckiest. Of all the papers consulted, the Washington one made the most persistent calls for help. The *Alexandria Gazette and Virginia Advertiser* first quoted the *Baltimore American* on the epidemic on August 2. After that there were long daily notes. When we go farther afield we find a few facts of interest in the Philadelphia *Daily News*. On July 25, a very short story states that according to the *Richmond Dispatch* and Richmond *American* there were rumors of yellow fever: according to a passenger from Norfolk, there had been to date twelve cases and five deaths. But another had flatly denied it. On August 17 there was mention of a meeting at the Merchant's Exchange to organize aid for the sufferers. After that date the notes become long. On July 26, we find the editor of *The New York Times* calling for a vigorous quarantine of ships from the seaports of Virginia. On August 1, we learn the infected districts of Portsmouth had been fenced off and that Baltimore had ordered that physicians be placed on all ships to keep off infected persons. The Chicago *Daily Democratic Press* was more interested in prairie wolves until August 17. It never did show the degree of interest of the papers of the seaboard cities, but it did enjoy a horror story. Chicagoans learned from a letter that in one room in Portsmouth, about the middle of August, there had been eight men ill with yellow fever in addition to a corpse they had been too weak to move. Furthermore, another corpse had been found jammed in the stairway outside the room. With the exception of this last paper, the newspaper source material becomes simply vast after the first of September.

On July 31 there was the glib report, " All the city except Barry's Row is healthful . . . sick occupants [there] are being removed to Oak Grove, beyond the city limits."

In August daily reports from the Board of Health, printed in the paper, continued the official attitude of heads in the sand. After weeks of pleasant reassurance the small item on August 9 to the effect that Isle of Wight County had quarantined itself against all Norfolk residents must have shaken some readers. Nor could they have been quieted by the news on the eleventh that a Howard Association had been formed in their home town. Such voluntary associations were only formed to combat the distresses attendant upon major epidemics of yellow fever. Minor ones were largely ignored.

Apparently, the authorities wished to keep the whole truth from the people. Despite the fact that the sixteenth had been designated a day of Humiliation and Prayer, and that there was a news note to the effect that Suffolk, a nearby town, was filling up with Norfolk refugees, the editor of the *Argus* finally wrote a long column on the twenty-first criticizing those who had fled, urging the people to be calm, and advising them to ward off yellow fever by not thinking of it or mentioning it. However, by the twenty-fourth he was beginning to admit how serious the problem had become. On the twenty-seventh he was still fiercely condemning all those who had left their duties and fled. On August 28, the mayor died of the fever. At last, on the sixth of September, there appeared the announcement of suspension of publication, with the words, " Only one in our office is free of the disease . . . six colored pressmen . . . sick, and everyone of our carriers is sick . . . aid is coming from the North, from Philadelphia, from Mobile."

Newspapers also give us a glimpse of the reaction of the world outside the terror. For instance, on August 15, in a splendid editorial entitled, " Who is my neighbor?," the *Daily Richmond Enquirer* blistered the heartless folk who had quarantined the Norfolk residents. Beginning with the August 18 issue we find almost daily long notes on the fever in Norfolk in that paper.

Yet more personal and poignant are letters extant in the collections of the Virginia Historical Society.[8] Dr. G. C. Whitehead wrote as follows to Hugh Blair Grigsby on September 17,

> [I am] a poor broken-hearted father . . . so sad and so overcome at the loss of my dear darling child that I am unfit. . . . Oh God I have no one to take her

[8] There is also in VaH a manuscript accounting of some of the Howard Association funds.

place. Oh my Heavenly Father forgive me for my grief . . . we have all been sick . . . all our servants but the cook and Tom . . . Eve is able to sit up and Oliver is dead. . . . our dear pastor Mr. Armstrong has been quite sick . . . I just learned Doctor Upshur was dying . . . disease is spreading all over town.

Of more medical interest is a letter he wrote to Grigsby two days later.

The fever has not abated in violence . . . in case you and Mary [in Williamsburg] get sick [with yellow fever] I will tell you the treatment the southern doctors advise: at the first symptoms go to bed, have a foot bath of mustard and hot water . . . . until perspiration . . . patient having a sheet and two blankets . . . room well ventilated but no draft over the bed . . . dose of castor oil then given . . . hot drinks (orange leaf tea especially favored in the south) . . . if sick stomach apply mustard plasters . . . If castor oil does not move the bowels, a glister of flaxseed tea will. If symptoms of delirium apply blisters to inside of leg between knee and ankle . . . keep in recumbent position . . . use bed pan . . . keep in bed four or five days after the fever has ceased . . . I think if my poor child had been treated this way she might be with us now, instead of bolusses of calomel and quinine. I called in Dr. Campbell of New Orleans who said our doctors are killing by such treatment . . . Oh My God tongue cannot tell the affliction and distress of our town, many poor creatures sicken and die without any attention for our physicians that are left are broke down.

The ideal treatment imported from the Deep South would seem a bit strenuous to us today!

During the same month in which these letters were written several sermons were delivered in other cities urging the relief of the suffering area. Some of these were published. The first of them, a discourse by George David Cummins,[4] delivered in Trinity Church, Washington, netted a collection of $325 for the sufferers. In his long sermon he quoted the Bible and noted the great plagues of Europe and England. "And now another great plague is upon us . . . its very severity proves it to be a minister of wrath. . . . God is in the pestilence and 'He rides upon the storm.'" He then mentioned the noble men and women who had hastened to the scenes of suffering. He felt certain that the pestilence served the purpose of showing the "vanity and frailty of human life." He ended with a lusty call for help, financial help.

There next appeared Conway's long sermon[5] which was published in

[4] George David Cummins: *The Pestilence—God's Messenger and Teacher.* Discourse in behalf of the sufferers of Norfolk and Portsmouth, Virginia delivered in Trinity Church, Washington, Sept. 9, 1855. Washington: G. S. Gideon printer, 13 pages. VaS.

[5] Moncure David Conway: *The True and False in Prevalent Theories of Divine Dispensations.* A discourse delivered in the Unitarian Church, Washington City, on Sunday, September 16, 1855, in behalf of the Norfolk and Portsmouth sufferers. Washington, D. C.: Taylor and Maury, Boston: Crosby, Nichols & Co., 1855. 20 pages. LC.

both Washington and Boston. After the usual biblical sermonizing he made a few very quotable statements. " ' Oh man you are one with your fellow man; what degrades him degrades you; the same disease destroys you, the same earth absorbs you,' so says the epidemic's voice. . . . There is nothing that can happen to the people of Portsmouth that is not for the best, even to themselves . . . The Best is over all—All's for the Best." His final words do not seem particularly consistent with this, " So I need not beseech you to give: Selfishness hoards itself poor; Charity gives itself Rich."

The last of September Richard Storrs [6] preached a very rhetorical sermon in Brooklyn. The following passages illustrate his style. " The flesh will shudder as the pincers tear. Not the muscle or the nerve only, but the sensitive soul that presides in the midst of them. . . . And every drop of that clear air became envenomed. It turned into a fang, and smote with a stroke deadly as the assassin's. The midday heat, the midnight darkness, each in its turn played down like the consuming lightning on those devoted and shrieking streets." All this, which makes no more sense to us in context than out, and yet more, was the prologue to a plea to the effect that you had best give to your brethren since one day you may be in the same boat.

These may have been the only sermons published during the epidemic, but the troubles were a fruitful subject for sermons for many months. In December, the George Armstrong mentioned in the Whitehead letter abstracted above addressed his shattered congregation.[7]

> The overflowing scourge has swept over us. . . . ' The pestilence that walketh in the darkness ' why did it come? [There was at that time some dispute as to the culpability of the *Ben Franklin*. Armstrong himself had no doubts.] . . . There were varied symptoms and severity. . . . very few intemperate persons recovered. . . . There was mercy mingled with God's judgements—it appeared in the slow progress of the first month which allowed so many to escape . . . After the last of August few went away. . . . God's mercy in the sympathy . . . in the timely arrival of physicians and nurses.

The last Sunday of the year Isaac Handy delivered another humble scorcher entitled *The Terrible Doings of God*,[8] in Portsmouth. There

[6] R. S. Storrs, Jr.: *Terrors of the Pestilence*; a sermon preached in the Church of the Pilgrims, Brooklyn, N. Y. on occasion of a collection in aid of the sufferers at Norfolk, Va., Sept. 30, 1855. New York: printed by J. A. Gray, 1855. VaS.

[7] George D. Armstrong, D. D.: *The Lesson of the Pestilence*. A discourse preached in the Presbyterian Church, Norfolk, Va. on the Sabbath, December 2, 1855. Published by members of the church. Richmond: Printed by Charles H. Wynne, 1855. 19 pages. VaS.

[8] Isaac W. K. Handy: *The Terrible Doings of God*. A sermon delivered in the Court

was no doubt in his mind: the people had been punished for their sins, and he praised the Lord for sending the frost which ended the plague.

Another funeral sermon was delivered in Richmond in March, 1856. The death of Dr. P. C. Gooch during the epidemic was the background for a very wordy oration by John Lansing Burrows [9] on death and pestilence. There was little substance to the talk. He was pleased to emphasize human ignorance. "Physicians are here reminded that there are limits to all human knowledge and skill."

The physicians, who also published at length, were much less eager to blame the disaster on God. A Lancaster, Pennsylvania, doctor named J. F. Reigert [10] was evidently the first physician to note this epidemic in print. He thought that plague flies spread certain contagions. After blaming the flies for cholera epidemics, he quoted at length a Norfolk correspondent concerning the yellow fever epidemic raging there and the vast numbers of yellow flies which had suddenly appeared during the height of the epidemic.

More detailed and pertinent was a thirty-nine page paper by Bryant.[11] He compared the filth of the Gosport area with the cleanliness of the more affluent Norfolk: the one was as seriously affected as the other in time.

St. Baptist Church, Portsmouth, Va. on Sabbath morning, Dec. 30, 1855 commemorative of the twenty-eight members of Old Dominion Lodge, No. V, who died during the late epidemic. Published by Request of the Lodge. Portsmouth: Printed at the Daily Transcript Office, 1856. 24 p. LC, P. We see here evidence of yet another newspaper, copies of which for 1855 I have been unable to find. The *National Intelligencer* did refer to it once, in early August.

[9] John Lansing Burrows: *Death Arbitrary.* Funeral sermon of Dr. P. Clairborne Gooch who died of yellow fever in Portsmouth, Va., Sept. 1855, Delivered in Richmond, Va., March 2, 1856. . . . Richmond: printed by C. H. Wynne, 1856. VaS.

[10] J. Franklin Reigert: *A Treatise on the Cause of Cholera.* An interesting discovery by J. Franklin Reigert of Lancaster City, Pa. (Lancaster): E. J. Pinkerton printer, 1855. 15p. L. C.

[11] J. D. Bryant, *M.D.*: *The Epidemic of Yellow Fever in Norfolk and Portsmouth, Virginia During the Summer and Fall of 1855.* Philadelphia: T. K. and P. G. Collins printers, 1856, 39p. L. C. Other contributions by doctors, not discussed in this paper but which may for the most part be found in the National Library of Medicine, are: E. D. Fenner: "On the yellow fever of Norfolk and Portsmouth, Va.," in *New Orleans M. and S. J.*, 1855-1856, *12*: 425-432. (Also in *Trans. Am. M. A.*, 1856, *9*: 711-720). J. W. Schoolfield: "Origin of the great epidemic of 1855," in *Virginia M. J.*, 1857, *9*: 439; 1857, *10*: 21. A. B. Williman: "An account of the yellow fever epidemic in Norfolk during the summer of 1855," in *Charleston M. J. and Rev.*, 1855, *9*: 162, 331. "Yellow fever in Norfolk, Portsmouth and Gosport, Va," in *Am. M. Gaz. and J. Health*, N. Y., 1855, n. s. *6*: 433-437. It is of passing interest to note that in Sanitary Commission: *Report on the . . . Nature and Treatment of Yellow Fever*, New York, 1862, our epidemic was noted on p. 12 as having been remarkable for the intense desire for cold drinks on the part of most victims. P.

He was grim about the deceptions practised by the captain of the *Ben Franklin*. He introduced some interesting statistics. Portsmouth was reduced in population by flight or death from eleven thousand to four thousand, Norfolk from sixteen thousand to five thousand. The degree of resistance to yellow fever of the colored was in inverse proportion to their admixture of white blood. In Portsmouth the mortality of the whites was forty-two percent, of negroes, five percent. The pure African was quite resistant. The statistical section was followed by a discussion of symptoms and treatment, illustrated with a number of case reports. Bryant states that venesection was not practised. Catharsis was the backbone of his treatment. Quinia was of no avail.

The best of the professional synopses of the epidemic was that done by a committee of physicians.[12] They unanimously agreed that yellow fever had been introduced by the steamer *Ben Franklin* from St. Thomas, and by that means alone. Their conclusion was based on the following considerations. This disease, so characteristically one of seaport towns, was uncommon in Norfolk. In the preceding forty years there had been only three relatively small epidemics in 1821, 1826, and 1852. The year 1855 had not been unusual climatically, had seen good sanitary conditions, in Norfolk at least. During the year, until the time of the epidemic, the citizens had been notably healthy. In all the previous epidemics which, incidentally, had all been traced to the West Indies, the disease had begun in Norfolk and spread to Gosport and Portsmoth where it had been less prevalent " because Portsmouth has had little or no commerce."

The 1855 epidemic, however, had begun in Gosport in a house adjoining the Page and Allen Shipyard where the *Ben Franklin* had been undergoing repairs for eleven days, since June 19. The fever began in Norfolk in Barry's Row seventeen days later (the incubation period as later discovered by Carter and Reed). Barry's Row was only 1.07 miles from Page and Allen, N. N. E. from it, with only water in between. (It would seem likely that a yellow fever victim fled from Gosport to Barry's Row and was bitten by endemic mosquitoes there). The epidemic spread, step by step, taking another forty days to proceed a little over a mile to the Princess Anne Road area, and yet another month to reach the extreme limits of Norfolk.

In the year before this report appeared, the first two of three relief reports were published. The Philadelphia Relief Committee rushed into

[12] *Report on the Origin of the Yellow Fever in Norfolk During the Summer of 1855* made to city councils by a committee of physicians. Richmond, Va.: Printed by Ritchie and Dunnavant, 1857, 44p. LC, VaU.

print a prolix, detailed account of its collections and expenditures for the aid of suffering Norfolk.[13] They even published most of the correspondence relative to this relief work, although the course of the epidemic itself was only briefly summarized. They listed the volunteer workers from Philadelphia and named the fifteen who died in that capacity.

A much thicker book was published by the Portsmouth Relief Association.[14] In addition to the treasurer's report and, again, the correspondence, we find a long discussion of yellow fever in general and this epidemic in particular. A list of the dead is given, as well as of the nearly four hundred orphans. This latter is emphasized by the frontispiece: a lithograph of the busy Portsmouth Orphan Asylum.

Smaller, and paper-bound, but of the same general nature is the report of Norfolk's Howard Association [15] published the next year. They list the great quantities of provisions, medicine, and clothing, in addition to the nearly $160,000 in cash, which poured in from twenty-four states.

For the most part more readable and even more graphic were the eyewitness accounts which appeared in book form in 1856. Perhaps the best of these, and well indexed, is that by Forrest.[16] Considerably scarcer is a book written out of personal sadness by one of the courageous souls who ministered loyally to the end, who lost loved ones, and who finally became ill himself.[17] Other sources give unstinting praise to his selfless Christianity.

Just as loyal to duty were the Reverend William M. Jackson and the Reverend James Chisholm, the one Episcopal rector in Norfolk, the other in Portsmouth. In fact, both of these men died at their posts and well deserved the hearty tributes they received in book-length biographies by

[13] *Report of the Philadelphia Relief Committee* appointed to collect funds for the sufferers by yellow fever at Norfolk and Portsmouth, Va., 1855. Philadelphia: Inquirer Printing Office, 1856. 136 p. VaU, LC, VaS.

[14] *Report of the Portsmouth Relief Association* to the contributors of the fund for the relief of Portsmouth, Virginia during the prevalence of the yellow fever in that town in 1855; the exhibit of the treasurer . . . and statements of other members . . . with a sketch of the fever etc. etc. Richmond: H. K. Ellyson's steam power presses, 1856. 364 p. VaU, VaS, P.

[15] *Report of the Howard Association of Norfolk, Va.* to all contributors who gave their valuable aid in behalf of the sufferers from epidemic yellow fever during the summer of 1855. Philadelphia: Inquirer Printing Office, Philadelphia, 1857. 113 p. VaU, VaS, P.

[16] *Op. cit.*

[17] George D. Armstrong, D. D.: *The Summer of the Pestilence*, a history of the ravages of the yellow fever in Norfolk Virginia, A. D. 1855. Philadelphia: J. B. Lippincott and Co., 1856. 192 p. VaU, VaS, P.

Cummins [18] and Conrad [19] respectively. Both books deal at some length with our epidemic.

The last of the nearly twenty tracts, pamphlets, and books which appeared in the year or so during and after the epidemic and which give us a white-hot impression of the catastrophe, was a children's book which must have made its little readers scream in their sleep.[20] Five pages are devoted to the Norfolk-Portsmouth epidemic. A plea is sternly made that children should not spend their money foolishly but give it to their parents to send to the Howard Association in Norfolk for use in the relief of orphans. The author then grinds in his message with forty verses of terrible poetry. The fourth and fifth stanzas will suffice to give the pitch:

> No sound breaks the stillness: the faithful church bell,
> That spoke but of late with its sorrowful knell
> Moves not to disturb the unharm'd belfry birds,
> And but sighs in the breeze the funeral dirge.
>
> The commerce in shrouds and in coffins has ceased;
> The sexton from duty by Death is released;
> And they who in tenderness stood by the bed
> Of the dying, lie now, with the sufferers, dead.

One would doubt that a second edition appeared!

A study of these sources opens a large window on another time. We see all too plainly the power of a terrible disease now practically unknown. We find shining examples of heroism, sacrifice, and steadfastness in a time of horror. We marvel at the scarcity of ghouls: very few even of the dead were robbed. We are struck by the powerful solace of religious faith, by the resignation to the conclusion that the pestilence was a punishment direct from God. This was the generation of our great-grandfathers. We trust that we their descendants would respond as well to catastrophe.

[18] George D. Cummins: *A Sketch of the Life of the Rev. William M. Jackson* (late rector of St. Paul's, Norfolk) Washington: Gray & Ballantyne, 1856. VaH.

[19] David Holmes Conrad: *Memoir of Rev. James Chisholm, A. M.*, late rector of St. John's Church, Portsmouth, Va., with memoranda of the pestilence which raged in that city during the summer and autumn of 1855. New York: Protestant Episcopal Society for the Promotion of Evangelical Knowledge, 1856. VaS, P.

[20] Philip Barrett: *Flowers by the Wayside.* Richmond: Price and Cardozo, 1856, pp. 96-100. VaH.

Additional Note: Surprisingly enough, a search of the periodicals of the day shows very little interest in the epidemic. Even the *Southern Literary Messenger* had no space for the catastrophe. The *Harper's Monthly* stands alone among a dozen examined. In its October, 1855 "Monthly Record of Current Events" there is the report that Norfolk and Portsmouth had been desolated by yellow fever which had swept away a very large proportion of the inhabitants of both places. That and no more until a short note appeared in June 1857.

CHARLES BENEDICT DAVENPORT AND THE BEGINNING OF HUMAN GENETICS *

CHARLES E. ROSENBERG

Though men have always speculated as to the nature of heredity, it was not until the second half of the nineteenth century that the principles which govern it became the object of concerted scientific investigation. The statistical methods of Galton and Pearson had for the first time, it seemed, provided a means of determining the elusive laws of human heredity. Yet within a few years of its creation, the new discipline of biometrics had, in the minds of many biologists, become obsolete.

In 1900, the rediscovery of Gregor Mendel's neglected conclusions seemed to provide an explanation for those phenomena which statistical methods were capable only of describing.[1] It was inevitable that the laws which the Austrian monk had found to govern inheritance in garden peas would soon be applied to human heredity. It was equally inevitable that this work should prove inconclusive. Man is not an ideal experimental animal, and the tools and concepts of biology at the turn of the century were not equal to unravelling the complexities of human genetics. Equally important, the very attitudes which inspired scientists to apply Mendelianism immediately to the inheritance of human traits, made an objective study of these traits impossible. To many of the early workers in the field, human genetics was indistinguishable from eugenics; their findings were blueprints for social action. Charles Benedict Davenport was the most active and prominent of such early American geneticists.

1

Charles Benedict Davenport was born in 1866. Though raised in Brooklyn, this descendant of Puritan divines always prided himself on his New England ancestry. "I have been an American for three-quarters of a century," he wrote in 1942. "No, longer than that—for over three

* This paper was originally read at a meeting of the Johns Hopkins Medical History Club, February 6, 1961.

[1] The mid-nineteenth-century interest in species and evolution, paradoxically to us, created a climate of opinion which discouraged interest in ascertaining the mechanisms of heredity. Cf. Elizabeth B. Gasking, "Why was Mendel's work ignored?," *J. Hist. Ideas*, 1959, *20*: 60-84. By the last two decades of the century, however, this climate of opinion had begun to change, as witness the work of Galton and Weissman, as well as the rediscovery of Mendel's work by three different investigators almost simultaneously.

hundred years. For this 'I' is composed of elements that were brought to this country during the 17th century." [1]

Despite an absorbing childhood interest in natural history, young Charles was destined by his authoritarian father for a career in the more reliable profession of engineering. It was only after he had graduated from the Brooklyn Polytechnic Institute, earned a bit of money with his engineering skills, and, still more important, attained his majority, that the prospective scientist was capable of defying his father's wishes.

The dedicated young man finally entered Harvard College in 1887, at the age of twenty-one, and within two years received his bachelor's degree. Another three years in Cambridge brought him a doctorate in zoology. Davenport then served Harvard for seven years as Instructor, until delivered from this Egyptian bondage by the University of Chicago's offer of an assistant professorship. In 1901, he was promoted to Associate Professor, only to resign three years later. He had been offered something which he had always wanted and which he could not well refuse, the directorship of his own research institute.

Largely at Davenport's initiative, the Carnegie Institution had established a Station for Experimental Evolution at Cold Spring Harbor, Long Island, and appointed the ambitious young zoologist as director.[2] Davenport was to occupy this position for thirty years, from his appointment in 1904 until his retirement in 1934. During these three decades he devoted his research almost entirely to human genetics.

While at Harvard and Chicago, Davenport had already established himself as a leader in the use of biostatistics. The years spent in engineering school had not been entirely wasted. Davenport brought to his zoological studies a mathematical preparation far greater than was customary among

[1] Cited by Morris Steggarda, "Charles Benedict Davenport (1866-1944). The man and his contributions to physical anthropology," *Am. J. Phys. Anthropol.* 1944, n. s. *2*: 167. The best sketch of Davenport's life is that written by his long-time associate, E. Carleton MacDowell, "Charles Benedict Davenport, 1866-1944. A study of conflicting influences," *Bios*, 1946, *17*: 3-50. Dr. MacDowell was kind enough to act as my cicerone through the Davenport papers deposited at the Department of Genetics, Carnegie Institution, Cold Spring Harbor. Additional data on Davenport's work and especially on his place in the eugenics and immigration restriction movement may be found in a recent dissertation by Mark A. Haller, "American eugenics: Heredity and social thought, 1870-1930" (unpublished doctoral diss., Univ. of Wisconsin, 1959), especially pages 129-147. The memoir by Oscar Riddle, another of Davenport's long-time associates ("Biographical memoir of Charles Benedict Davenport 1866-1944," in *National Academy of Sciences, Biographical Memoirs*, Washington, D. C.: National Academy of Sciences, vol. XXV, 1948, pp. 75-110) is largely based on the previous study by MacDowell.

[2] For the story of Davenport's efforts to have the Station established, see MacDowell, "Davenport," pp. 15-24.

biologists of his day. Until his acceptance of Mendelianism, Davenport had been convinced that the future of biology lay in these new quantitative methods. The application of these procedures, he wrote enthusiastically in 1900, had already borne fruit.

> The role of natural selection, the method of evolution, and the laws of inheritance are being discovered. Already we are able to predict greater results from the quantitative methods in biology, especially where combined with experimentation, than any which have yet appeared.[4]

These central problems of biology all seemed within reach of solution—even the vexing question of heredity, for heredity was, as Davenport put it, "only a special case of correlated variation; a correlation between parents and offspring or between any two blood relatives."[5]

With scientific opinion of heredity in so murky and ill-defined a state, the generalizations of Mendel appeared with almost the power of revelation. For the first time, heredity could be understood and even predicted.

Charles Davenport had always been interested in heredity and evolution, and he lost no time in acquainting himself with these new ideas. He was, in fact, the author of one of the earliest, if not the very first, American discussion of the papers by Correns and De Vries—who along with Tschermak whose work was not known to Davenport—had independently rediscovered Mendelian principles. (The article appeared in June of 1901 in the *Biological Bulletin* of the Woods Hole Marine Biological Laboratory, though Davenport's diary records his having written it in November of the previous year).[6] Though he did not immediately discontinue his

[4] "A history of the quantitative study of variation," *Science*, 1900, n. s. *12*: 870. Davenport was prominent enough in biostatistics for Karl Pearson to have asked him to serve as American editor of *Biometrika* when the journal was founded in 1901. Davenport was also the author of the first American hand-book on the subject, *Statistical Methods with Special Reference to Biological Variation*, New York: John Wiley, 1899. This little manual eventually went to four editions, the last in 1936.

[5] "The statistical study of evolution," *Popular Sc. Monthly*, Sept., 1901, p. 459. It must be recalled that in 1900 the ideas of Weissman were still very much a matter of controversy. Indeed, the entire problem of heredity was, to most biologists and physicians, no clearer than it had been centuries earlier. Davenport, for example, suggested that biometrics might be used in finally proving or disproving the existence of telegony, the idea that a woman's first mate might have an effect upon her children by a subsequent sire. Thus, a woman having intercourse with a Negro might later have dark pigmented children by a white father. "The aims of the quantitative study of variation," in *Biological Lectures from the Marine Biological Laboratory, 1899*, Boston: Ginn and Co., 1900, p. 272.

[6] "Mendel's law of dichotomy in hybrids," *Biol. Bull.*, 1901, *2*: 307-310. Davenport's diary, deposited with his papers at Cold Spring Harbor, notes his having written the article on November 27, 1900. MacDowell, "Davenport," p. 28.

biometric studies of variation and selection, Davenport had, by 1904, become a thorough convert to the ideas of Mendel and De Vries and, with personal differences adding to their rancour, Davenport broke sharply with Pearson and his system of biometrics, or "applied statistics" as he now referred to it.[7]

Mendel's work had an almost euphoric effect on the biology of the early 1900's, an effect which can, with some justice, be likened to that which the germ theory had had upon the medical profession in an earlier generation. Both theories opened new areas of research, and in both cases much of this research was premature and uncritical. And Charles Davenport was not only uncritical, he was almost painfully ambitious and emotionally committed to the results of his studies. There could be no more important social goal, he believed, than the enactment of genetic truths into law.

Even before 1900, Davenport had been deeply interested in the eugenics movement. His original enthusiasm for Galton's biometrics was at least partially a reflection of this interest. True progress, he believed, could come only through improvements in man's germ plasm. Heredity, as Davenport warned in 1910, "stands as the one great hope of the human race; its savior from imbecility, poverty, disease, immorality." In this conviction, Davenport was never to be shaken. Social problems, he admonished a group of medical students in 1940, were coming more and more to be recognized as biological problems.[8]

Unfortunately, human beings are not so easily studied as garden peas or drosophila. Nor are most human traits easily accommodated by the simplistic doctrine which Mendelianism seemed to most biologists to be in the century's first decade. Indeed, as late as 1912, Davenport wrote confidently that "modern studies in heredity have made that science relatively simple."[9] When he began research in genetics, Davenport assumed that

[7] The break between Davenport and Pearson, despite their personal differences, was very much a part of the more general conflict between those, like Bateson, who wholeheartedly accepted the ideas of Mendel and De Vries, and men, like Pearson, who for one reason or another remained sceptical. For a number of references to articles in this controversy, cf. Beatrice Bateson, *William Bateson, F. R. S. Naturalist,* Cambridge: At the University Press, 1928, pp. 464-465 appendix.

[8] "Euthenics and Eugenics," *Popular Sc. Monthly,* Dec. 1910, p. 20; "Some social applications of eugenics," in *Medical Genetics and Eugenics,* Philadelphia: Woman's Medical College of Pennsylvania, 1940, p. 40, cf. in this connection: "The value of zoology to humanity," *Science,* 1915, n. s. *16*: 337; "Mendelism in man," *Proc. Sixth Ann. Cong. Genetics,* 1932, *1*: 137, 140; Davenport to Henry H. Goddard, Sept. 17, 1910; Davenport to Frederick Osborn, Feb. 10, 1930.

[9] "Some social applications of modern principles of heredity," *Tr. Fifteenth Internat. Cong. Hyg. and Demog.,* 1912, *4*: 658. The same year, Davenport wrote to Irving

human traits were discrete, unit characters determined by pairs of distinct immutable factors, one of which might often mask or dominate the other. Davenport tended to assume as well that dominance meant the presence of something, and recessiveness its absence. It was not yet customary to think in terms of alternatives. Working after 1900 almost exclusively with human material, he was, moreover, forced to rely for data upon pedigree studies.

Yet despite these conceptual and methodological limitations, Davenport made real contributions to the study of human genetics. He was, for example, one of the first investigators to apply the concept of polygenic inheritance to a human trait. In 1910, in a paper published with his wife Gertrude, Davenport concluded that the gradations of human skin color might well be determined by the combined action of two independent pairs of factors.[10] Indeed, as early as 1908, Davenport had suggested that so-called blending inheritance was probably due to "a Mendelian inheritance of minute units."[11] He was also one of the first to explain the determination of a human trait (eye color) in terms of multiple alleles. Where the pedigree method was of value, as in a number of hereditary or supposedly hereditary defects such as albinism, Huntington's chorea, and otosclerosis, Davenport was able to contribute valuable data.

To Charles Davenport, however, those traits which most demanded study were those determining human behavior. Yet it was in the field of behavior genetics that the pedigree method was most inadequate and in which Dr. Davenport's social commitments were in sharpest conflict with his scientific objectivity. It was also, ironically enough, the area in which the discarded correlations and standard deviations of the Galton laboratory would have been most useful. Not only mental disease and

Fisher, stating that there wasn't "very much more mathematics to Mendel's law than that ½ of ½ is¼." June 15, 1912.

[10] C. B. Davenport and Gertrude C. Davenport, "Heredity of skin pigment in man," *Am. Naturalist*, 1910, *44*: 642-672, 705-731, cf. Curt Stern, *Principles of Human Genetics*, 2nd ed., San Francisco: W. H. Freeman, 1960, p. 351. Over the years, however, Davenport rigidly applied the formula which had seemed to explain successfully the inheritance of skin color to other traits such a body-build, otosclerosis, and suspectibility to goiter, though in the latter two conditions he assumed that one of the factors was on an autosome, the other on a sex-chromosome. Davenport, *Body Build: Its Development and Inheritance*, Cold Spring Harbor: Eugenics Record Office, Bulletin No. 24, 1925, p. 20; *idem*, *The Genetical Factor in Endemic Goiter*, Carnegie Institution of Washington, Publication No. 428, Washington: Carnegie Institution, 1932, p. 44; Davenport, Bess L. Milles and Lillian B. Frink, "The genetic factor in otosclerosis," *Arch. Otolaryng.*, 1933, *17*: 135-170, 340-383, 503-548.

[11] Davenport to H. H. Laughlin, April 1, 1908.

mental deficiency, but such characteristics as shiftlessness, licentiousness, and criminality were all attributed to the presence or absence of one or more Mendelian determiners.

But could such aspects of human behavior be studied? Let us look more specifically at one of Davenport's personality studies and see how he attempted to approach such problems. In 1917, with war imminent, he undertook to isolate those criteria which might be useful in predicting the success of future naval officers. Davenport began by choosing sixty-eight historically prominent naval commanders and, making use of biographies, memoirs, and biographical dictionaries, compiled a list of those characteristics which they had displayed as children and which, Davenport asserted, could be used to predict the likelihood of their success as officers. Foremost among such desirable traits, he concluded, was an inborn love of the sea, or *thalasophilia*. This lust for the sea, Davenport contended, was almost certainly due to a sex-linked recessive factor. (That it was sex-linked seemed apparent, because men, not women, ran away to sea.)[12]

Other social traits could, similarly, be shown to depend upon genetic determinants. Prostitution, for example, was a consequence neither of economic nor psychological factors, but of hereditary predisposition. In a study of 350 "wayward" girls, only one, Davenport reported, had entered the ancient trade for economic reasons. Innate eroticism was the causative factor, and this was produced by "an additional germinal determiner that less licentious persons do not have."[13]

Charles Davenport was to adhere consistently to this interpretation of human behavior until his death in 1944. His convictions were too deeply rooted in his opposition to social change and too much a product of the scientific concerns and presuppositions of the generation in which he grew to maturity.

2

Like many of his scientific contemporaries, Davenport was a rigid biological mechanist. Every aspect of human behavior had its origins in definite physiological and anatomical mechanisms. Behavior, he wrote in 1917, "is reaction to stimulus, and the nature of the reaction is deter-

[12] Davenport, assisted by Mary Theresa Scudder, *Naval Officers. Their Heredity and Development*, Carnegie Institution of Washington, Publication No. 259, Washington: Carnegie Institution, 1919.

[13] "Some social applications," pp. 3-4. Davenport also argued that eroticism was inherited as a Mendelian dominant. "Inheritance of some of the elements of hysteria," *Illinois M. J.*, 1913, *24*: 289-290.

mined in part by the nature of the reacting nervous machinery." [14] Thus variations in behavior implied underlying structural and functional differences. If Negroes and whites differed in their performance on psychological tests, it was because they differed in neurological attributes just as they did in skin color or hair texture. "The brains," Davenport asserted in 1926, "of great speakers are of one type; those of philosophers of another type; those of the menial another type; those of morons, imbeciles, Mongolian idiots of still other types. The mental output is what it is, to a great degree, because of the nature of the machinery that controls the output." [15]

Nor did it seem arbitrary to Davenport that he should regard such traits as industry, sympathy, or loyalty as though they were well-defined unit characters. Influenced by concepts of cerebral localization which had begun with the neuro-anatomical theories of Gall, many nineteenth century neurologists and psychiatrists found it increasingly natural to think of intellectual and emotional traits as discrete entities, localized in particular areas of the brain.[16] If there was a speech center, then why not a center for eroticism as well? And, assuming as Davenport did, that such traits were anatomically grounded and functionally independent, it was equally natural to assume that they should have a genetic basis. For Davenport it was unquestionable.

All organic phenomena were seen by Davenport's generation of biologists in relation to their place in the process of evolution. Davenport, unlike many of his colleagues however, regarded not only physical, but cultural and social, traits as being products of this same evolutionary

[14] *Naval Officers*, p. 9.

[15] "The nature of hereditary mental defect," p. 5, reprinted from *Proc. Fiftieth Ann. Session of the American Assoc. for the study of the Feeble-minded*, 1926. For similar statements, cf. Davenport and Morris Steggarda, *Race Crossing in Jamaica*, Carnegie Institution of Washington, Publication No. 395, Washington: Carnegie Institution, 1929, p. 469; Davenport, *The Feebly-Inhibited*, Carnegie Institution of Washington, Publication No. 236, Washington: Carnegie Institution, 1915, p. 119.

[16] The only way to conquer an individual failing such as criminality, Davenport argued, was to use another trait, such as fear, to counteract it. "Cutting out physical pain from punishment is the invention of the sentimentalist;" he wrote in 1928, "not of the student of physiology and of Nature's laws." "Crime, heredity and environment," *J. Hered.*, 1928, *19*: 312. The similarity of this cure for crime to phrenological schemes for moral improvement is not completely coincidental. For a useful survey of the development of the concept of cerebral localization, *see* A. Earl Walker, "The development of the concept of cerebral localization in the nineteenth century," *Bull. Hist. Med.*, 1957, *31*: 99-121. For Gall and the development of phrenology, *see* Owsei Temkin, "Gall and the phrenological movement," *Ibid.*, 1947, *21*: 275-331 and Erwin H. Ackerknecht and Henry Vallois, *Franz Joseph Gall, Inventor of Phrenology and his Collection*, Madison: University of Wisconsin Medical School, *Wisconsin Studies in Medical History*, No. 1, 1956.

process.[17] Criminals, prostitutes, and tramps—the feebly-inhibited in Davenport's terminology—were simply those unfortunates lacking the gene, or genes, whose appearance through mutation in man's distant past had allowed him to control his more primitive asocial instincts and thus develop civilization. Ontogeny, as Davenport believed, recapitulated phylogeny in the child's socialization as well as in his physical growth. The child, like prehistoric man, was selfish, violent, and erotic. Normal children, however, were able as they grew older to control, to shunt off, as Davenport put it, these primeval impulses. The criminal was a criminal, the prostitute a prostitute, because their genetic makeup had not provided them with the neurological or physiological means of circumventing these brute urges.[18] Feeble-mindedness too resulted from the persistence of more primitive genes. It was, as Davenport declared, "an uninterrupted transmission from our animal ancestry. It is not reversion; it is direct inheritance."[19]

[17] It was almost second-nature to Davenport—and many of his contemporaries—to think in phylogenetic terms. In his 1901 article on Mendel, Davenport noted in passing that: "In some cases the dominating form is the systematically *higher*; in others, it is the older or ancestral form." "Mendel's law of dichotomy," p. 308. In his later years, after increasing criticism of his genetic work drove him towards physical anthropology, Davenport's anthropomorphic researches frequently consisted of gathering data to prove that ontogeny really did recapitulate phylogeny. "Evidence of man's ancestral history in the later development of the child," *Proc. Nat. Acad. Sc.*, 1933, *19*: 787; "Ontogeny and phylogeny of man's appendages," *Ibid.*, 1934, *20*: 363; "Child development from the standpoint of genetics," *Scient. Monthly*, 1934, *39*: 97, 115–116.

[18] Davenport to David Starr Jordan, Feb. 6, 1912; "Heredity, culpability, praiseworthiness, punishment and reward," *Popular Sc. Monthly*, July, 1913, p. 35; "Light thrown by the experimental study of heredity upon the factors and methods of evolution," *Am. Naturalist*, 1912, *46*: 129; "Crime, heredity and environment," p. 307; "Heredity in nervous disease and its social bearings," *J. A. M. A.*, 1912, *59*: 2141-2142.

Davenport's debt to Lombroso and criminal anthropology is apparent, as is his debt to the earlier theory of degeneration (from which, of course, Lombroso drew his inspiration). In addition to his acceptance of the idea of "atavism," Davenport believed, for example, in the connection between insanity and genius, in the possibility of physical stigmata marking the insane and feeble-minded, as well as in the existence of a basic "neuropathic weakness," which might manifest itself in insanity, pauperism, mental retardation, or criminality. This doctrine which began in the 1850's as a melioristic one, assumed, of course, to a generation rejecting the inheritance of acquired characteristics, a conservative and deterministic aspect. The basic study of the idea of degeneration is still that by G.-P.-H. Genil-Perrin, *Histoire des origines et de l'évolution de l'idée de dégénérescence en médicine mentale*, Paris: Faculté de Médecine, 1913. Doctoral thesis. The best short account in English is that by E. H. Ackerknecht, *A Short History of Psychiatry*, tr. from the German by Sulammith Wolff, New York: Hafner, 1959, pp. 47-51.

[19] Cf. "Heredity of constitutional mental disorders," *Psychol. Bull.*, 1920, *17*: 303; "Heredity in nervous disease," pp. 2141-2142; Davenport to David Starr Jordan, Feb. 9, 1922.

Social and physical evolution were one. Attempts to improve man by changing his environment were, Davenport believed, doomed to futility. The efforts of social workers, even of medicine and public health, were ultimately contrary to the direction of evolution. In the years before 1900, liberal intellectuals, led in this country by Lester Ward, had formulated a detailed indictment of Social Darwinism, an indictment based on the assumption that a qualitative distinction existed between physical and social evolution.[80] In Davenport's hands this dichotomy disappeared; cultural change merely reflected underlying physical developments. The ideas of Mendel and De Vries had been used to adapt those of Herbert Spencer to the demands of a new century.

"Barring a few highly exceptional conditions," Davenport wrote in 1911, "poverty means relative inefficiency and this in turn usually means mental inferiority." Wages and salaries, profits and honors were the rewards given by society to its "effective" and moral members. The principle of equality was a biological absurdity. Yet these truths seemed to him increasingly ignored in twentieth-century America. The values which Davenport had assumed as a child were, he felt, being replaced by those of paternalism. "A demand for more social workers," he warned in 1912, "and larger institutions for defectives will be the first alarm of the approaching end of the old regime." And as the century progressed, his fears seemed to have justified themselves. Welfare agencies, he wrote to Frederick Osborn in the terrible December of 1932, were a "force crushing out civilization."[81]

3

A preoccupation with the idea of race was characteristic of European and American minds in the half-century between 1880 and 1930. Charles Davenport was no exception: two of his major research interests were the effects of race-crossing and the comparative social traits of different races. Davenport never doubted that racial traits were as immutable as the genes which produced them.

America, as Davenport interpreted the nation's history, was the product of Anglo-Saxon genes, and it seemed to him questionable whether this democracy could long survive the dilution of the blood which had created it. The only hope of the republic, he believed, lay in the success of the

[80] For a survey of this conflict, *see* Richard Hofstadter, *Social Darwinism in American Thought, 1860-1915*, Philadelphia: Univ. of Pennsylvania, 1944.

[81] *Heredity in Relation to Eugenics*, New York: Holt, 1911, p. 80; "Heredity, culpability, praiseworthiness," p. 37; *Delineator*, April, 1912, p. 272; Davenport to Frederick Osborn, Dec. 23, 1932.

immigration restriction movement, a cause to which he gave his wholehearted support and to which he lent without reservation the prestige of his scientific position. As a consequence of the tremendous influx of immigrants from Southeastern Europe, Davenport wrote in 1911, the American population would "rapidly become darker in pigmentation, smaller in stature, more mercurial, more attached to music and art, more given to crimes of larceny, kidnapping, assault, murder, rape and sex immorality." [22]

By the late twenties and early thirties such pronouncements were being received by American scientists with increasing uneasiness. After the National Socialist party had implemented these ideas in Germany, such concepts began to seem not merely gauche but dangerous. The intellectual break which most geneticists had made with the eugenics movement in the twenties had become a public one by the late thirties. In 1940, the Carnegie Institution withdrew the last of its support from the eugenics program at Cold Spring Harbor. Davenport was now seventy-four, six years in retirement, a prophet without followers. Yet though the crusade which had filled his life had ended in failure, he did not despair, but continued to work actively until almost the day of his death in 1944. In his ten years of retirement, Davenport published forty-seven papers, wrote one book, and revised another.[23]

* * *

Human genetics has been recreated in the past three decades. Eugenics is, in 1961, more the concern of the historian than the scientist. What then were the contributions of Charles Benedict Davenport to the nation and the science he wished so well? For his career is more than an object lesson in the ways through which social and personal attitudes can distort the conclusions of science.

If only because of his acceptance and championing of both biostatistics and Mendelianism, Davenport would have been of real importance in the

[22] *Heredity in Relation to Eugenics*, p. 219. The story of Davenport's relationship to the eugenics and immigration restriction movements, as well as the fate of these movements in the 1930's, is excellently told by Haller, "American Eugenics."

It might, however, be noted that Davenport's conservative rejection of the change he saw about him and of those peoples whom he accused of bringing this change, was not the only one possible for a person of his time and class. Society limits and provides alternatives; individual personality chooses between them. Davenport's brother, for example, the Reverend William Davenport, directed a settlement house for Italian immigrants in Brooklyn and wrote often to his brother at Cold Spring Harbor, defending the immigrants as victims of circumstances, cf. especially, William Davenport to C. B. Davenport, Feb. 18, 1924.

[23] MacDowell, "Davenport," p. 34.

development of human genetics. Though never a major contributor in either field, he had the imagination to realize at once the significance of these new ideas. Davenport emphasized as well the importance of constitutional factors at a time when most of his contemporaries found it easy to overlook them. The germ theory, he pointed out again and again, was only a partial explanation of disease processes. Everyone was exposed to the tubercle bacillus, but only some died of tuberculosis. Not all alcoholics exhibited delirium tremens, he argued, nor was goiter simply the result of iodine insufficiency.

Perhaps most important, Davenport was an early example of that much neglected figure in the history of science, the statesman administrator, the ambassador to the laity from the world of science. Davenport not only created a wide interest in genetics with his writings and addresses, but was able as well to attract what were, for his time, enormous research funds. The Harriman, Huntington, and Rockefeller families, as well as the Carnegie Institution, contributed to his research programs. Such blessings were not so common in the first quarter of the century as they have become today. There were few American geneticists of note in the first three decades of the century who did not spend at least a summer at Cold Spring Harbor. It is probable that it will be for such activities outside the laboratory, rather than for those in it, that Charles Benedict Davenport will ultimately be remembered.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

CORRESPONDENCE, REPORTS, AND QUERIES [1]

AMERICAN ASSOCIATION FOR THE HISTORY OF MEDICINE, INC.

The thirty-fourth annual meeting of the A. A. H. M. was held at Chicago, Ill., on May 18, 19, and 20, 1961. Pending the report of the meeting by the Secretary-Treasurer of the Association, the following transactions are announced here:

Elections

Secretary-Treasurer (1961-1963): John B. Blake.

Members of the Council (term expiring 1964): L. R. C. Agnew, Louise Darling, Claude E. Heaton, Frank B. Rogers.

Awards

The Osler Medal was awarded to Eugene A. Cimino, University of Buffalo, School of Medicine, for his essay entitled: "Sixty-three Ancient Roman Remedies. Translation and analysis of the original Latin text of Quintus Serenus Sammonicus." Honorable mention was awarded to George Podgorny, Bowman Gray School of Medicine, for his essay on "The History of Bimaristans."

The William H. Welch Medal was awarded to George Rosen "for contributions to the social history of medicine during the period 1956-1961, in continuation of his previous meritorious work in this field."

Editorial Committee (1961-1963)

Esmond R. Long, Genevieve Miller, Owsei Temkin, ***chairman.***

Annual Meetings

The thirty-fifth annual meeting will be held in Los Angeles, May 3-5, 1962.

The thirty-sixth annual meeting, 1963, will be held in Boston.

The thirty-eighth annual meeting, 1965, will be held in Philadelphia.

QUERIES

Query 1: Are data available on premature infants who later achieved fame?

Query 2: What is the date, and who is the author, of the first description of intraperitoneal adhesions? Moreover, when did the first significant paper dealing with clinical pathology due to the formation of adhesions appear?

[1] Queries deemed sufficiently pertinent by the Editor will be published anonymously here. Answers should be sent to the Editor who will forward them to the questioner and will select those suitable for publication over the name of the correspondent.

ANNOUNCEMENTS

NATIONAL NEWS

American Chemical Society

The first regional meeting of the division of History of Chemistry of the American Chemical Society is planned for June 16, 1961 at Monmouth College, West Long Branch, N. J.

American Institute of the History of Pharmacy

The annual meeting in Chicago, April 25 and 27, 1961, was followed by celebrations in Madison, Wis., of the twentieth anniversary of the founding of A. I. H. P.

The annual essay competition sponsored jointly by the Institute and the American Society of Hospital Pharmacists was won by Mrs. Elvera H. Dressler. Co-author of the essay, "A History of the Illinois Society of Hospital Pharmacists," was Professor Dwight L. Deardorff.

An Edward Kremers Award to stimulate writing of the history of pharmacy has been established under an annual grant to be made by the Kremers-Urban Company of drug manufacturers. The award will be bestowed upon an American citizen "for an original publication or series of related articles . . . pertaining primarily to historical or historico-social aspects of pharmacy." Forms upon which to recommend a candidate may be obtained from Ernst W. Stieb, 356 Pharmacy Building, Madison 6, Wis., and must be returned before December 31.

Civil War Centennial

The Richmond Academy of Medicine is preparing an exhibit on the Medical aspects of the Civil War under the Chairmanship of Dr. Harry J. Warthen, to open on April 1 to the general public.

Durham, N. C.

The "Associates of the Trent Collection in the History of Medicine" has been formally organized at Duke University Medical Center. Dr. George J. D'Angelo is chairman of the Board of Directors. The collection is named after Dr. Josiah Trent.

International Congress of the History of Science

The Xth International Congress of the History of Science will be held at Cornell University, August 26-31, 1962 and at The American Philosophical Society, Philadelphia, August 31–September 2, 1962. Interested persons should communicate with the Secretary, Xth International Congress of the History of Science, Cornell University, Ithaca, N. Y. The section on "Biological and Earth Sciences after 1600" will include papers on medical biology.

The Logan Clendening Travelling Fellowship in the History of Medicine

Applications are invited for the above Fellowship which is tenable for three months during the summer of 1962. The Fellowship is of the value of $1,000 and is open to registered medical students (or college seniors accepted for medical school) of any recognized medical school in the United States or Canada. This Fellowship memorializes the late Dr. Logan Clendening (1884-1945) who was a keen bibliophile and medical historian of international renown. The Fellowship will enable medical students to follow at least two of Dr. Clendening's abiding interests—travel and medical history. Applicants may elect to travel anywhere in the world for the purpose of studying any aspect of medical history of interest to them. Details of proposed projects should be submitted on a special form to be returned not later than April 1, 1962, and obtainable from L. R. C. Agnew, A. M., M. D., Chairman, Department of the History of Medicine, The University of Kansas Medical Center, Kansas City 12, Kansas.

Louisville, Kentucky

A Convocation in honor of Emmet Field Horine, M. D., was held in the Rankin Amphitheatre of the Louisville General Hospital, May 10, 1961. The address, given by Walton B. McDaniel, 2d, was entitled "Medical Liaison Between Louisville and Philadelphia." The printed program featured the impressive bibliography of Dr. Horine enclosed in the dust-jacket of his newest book, the biography of *Daniel Drake (1785-1852)*.

University of Illinois

The eighteenth annual D. J. Davis Memorial Lecture on Medical History will be given at 1 p. m., May 17, 1961, in Room 106, University of Illinois College of Medicine, 1853 West Polk Street, Chicago 12, Ill. The Lecturer will be Otto F. Kampmeier, Ph. D., M. D., Professor of Anatomy Emeritus, University of Illinois College of Medicine. His subject will be: "The Turbulent Rise of Medical Education in Illinois."

Washington University, St. Louis

Washington University has appointed Dr. Estelle Brodman as Associate Professor of Medical History, Department of Anatomy, and Librarian of the School of Medicine, as of the 1961-62 academic year.

PROGRAMS OF MEETINGS

Beaumont Medical Club (Yale)

April 14, 1961: Beaumont Lecture, "Hippocratic Neurology," Edwin S. Clarke.

The Johns Hopkins Medical History Club

April 7, 1961: "International Health Agencies," Timothy D. Baker; "Plastic Surgery: Past and Present," Milton T. Edgerton.

Society of Medical History of Chicago

April 12, 1961: "Johannes Müller—Naturalist and Founder of Modern Physiology," Johannes Steudel.

NEWS FROM ABROAD

England

The Faculty of the History of Medicine and Pharmacy of The Worshipful Society of Apothecaries of London announces the Second Annual General Meeting at Apothecaries' Hall, April 28, 1961. Sir Geoffrey Keynes, Kt., M. A., M. D., F. R. C. P., F. R. C. S., will deliver the Gideon Delaune Lecture, entitled "Timothy Bright."

The Second British Congress on the History of Medicine and Pharmacy will be held in London, September 27-29, 1961. The theme of the Congress will be: "Chemistry in the Service of Medicine." All correspondence in connection with the Congress should be addressed to: Dr. F. N. L. Poynter, Honorary Secretary, The Wellcome Historical Medical Library, The Wellcome Building, Euston Road, London, N. W. 1.

Second Pan-American Congress of the History of Medicine

The Second Pan-American Congress of the History of Medicine will be held in Caracas, Venezuela, June 25-29, 1961, in conjunction with the First Venezuelan Congress of the History of Medicine commemorating the 150th anniversary of Venezuelan Declaration of Independence. Official theme of the Congress will be: "La Medicina Colonial en cada uno de los Países Americanos." Free subjects include the history of medicine and kindred sciences, paramedical philosophy and literature, medical folklore. Persons wishing to take part in the Congress should submit a *curriculum vitae* and three photographs to the Secretaría General, Palacio de las Academias, Caracas, Venezuela. Registration fee for participants, $20; for accompanying persons, $10.

BOOK REVIEWS

ROBERT O. STEUER AND J. B. DE C. M. SAUNDERS. ***Ancient Egyptian and Cnidian Medicine.*** The Relationship of their Aetiological Concepts of Disease. Berkeley and Los Angeles: University of California Press, 1959. 90 pp., $3.00.

The authors attempt to demonstrate in this interesting essay that more than a coincidental relationship exists between certain basic aetiological concepts of Egyptian and early Greek medicine. Particular emphasis is placed on the functional equivalence of *wḥdw* in the Egyptian medical papyri and of *perittōma* among certain non-humoral schools of Greek medicine. Because the latter seems earliest and most firmly associated with the Cnidian school, this is taken as the source of the concept in the Greek world, and hence the title of the study. Groundwork for the present thesis was done by Mr. Steuer in an earlier publication[1] in which the importance of putrefaction as an aetiological agent was stressed for both Egyptian and Greek medical thought, but at that time no more definite connection between the two cultures could be established.

After a short general introduction reviewing the role of *wḥdw* in Egyptian medicine, we come to an extended discussion of certain terms in Greek. Three main sources are used: (A) Aristotle, (H) the Hippocratic Corpus, and (L) the Papyrus Anonymus Londinensis. Because the latter two sources are essentially composite, one could anticipate some complexity in the argumentation, but hardly the confusing, stream-of-consciousness analysis with which we are presented. The most important section for understanding the main problem at hand begins on p. 27 and ends on p. 36, wherein we are given the evidence from L which links *perittōma* to the Cnidian school as a putrefactive, mobile, aetiological *materia peccans*. I would seriously recommend to the prospective reader that he begin the book with this section; he may then return to the beginning of the Greek discussion on p. 7, where the authors commence their analysis of the Aristotelian use of *perittōma* in the established frame of reference. The argument proceeds irregularly through a discussion of *perittōma* and its associations with *kopros* (feces), the difference between *pepsis* and *sēpsis* as distinct parts of the digestive process, and the *dynamis phthartikē* (putrefactive potential) of *perittōma*. Up to p. 16 the discussion is based on A, with brief excursions into H and L; on p. 16, however, focus is shifted from A to H and the Hippocratic use of the term *sēpedōn*, with a demonstration that in H, or at least in *De morbis IV*, putrefaction has both benign and pathogenic functions, depending on the length of time the nutriment acted upon remains in the body. Attention is also called to the conflict between the humoral and the putrefactive concepts in H. On p. 21 we turn to the concept of *perittōma* in L, which, after a brief digression on the aetiological function of *physai*, leads to the main section of p. 27, as noted above. In general, then, the discussion of the Greek evidence up to this point seeks to prove that in both A

[1] R. O. Steuer, "*wḥdw* Aetiological Principle of Pyaemia in Ancient Egyptian Medicine," *Supplements to the Bulletin of the History of Medicine*, No. 10 (Baltimore, 1948).

and H a putrefactive aetiology is present and in conflict with the more easily discerned concept of humoral balance, and that neither A nor H can be understood correctly without recognition of this fact.

The Egyptian side of the argument is then taken up, proceeding from the definition of *wḥdw* as a mobile *materia peccans*. Particular attention is given to the prescription of Papyrus Berlin, XIII, 3-7, in which we find mention of a pool of *wḥdw* which the sick man is carrying in his body; we are told that if it rises in him, it will result in an occlusion. Comment on this prescription leads to two points: (1) the similarity of the symptoms in the given case with those of *plēthos* in L and of *plēsmonē* in H; (2) the verb *ṯsy*, to rise, and the derivative nouns *ṯsw* and *ṯsw* refer to the pathological rising of excrements in the body acting as aetiological agents.

In summary the authors stress once again, as the most immediate connecting link between Egyptian and Cnidian aetiology, the belief that the rising of fecal excrement in the body is a primary cause of disease, a belief which, in conjunction with the *perittōma* concept and the underlying views on putrefaction, held sway in Greek medicine until replaced by the humoral theories of the Coan school.

An essentially simple thesis has been presented in this work. To the extent that it can be proven on the basis of our present understanding of the texts involved, the authors may be said to have done so. But many doubts will assail the thoughtful reader, especially in the light of our ignorance when dealing with many details of the Egyptian medical papyri and, indeed, with Egyptian conceptual practices in general. The interested reader will find a new edition of most of the Egyptian material discussed, with translation and commentary, in the recent *Grundriss der Medizin der alten Ägypter*, published under the general editorship of Hermann Grapow. Even a quick perusal of these texts and discussions will, I believe, show him the enormous handicaps under which any scholar dealing with Egyptian medicine must operate. Perhaps the most pertinent question that could arise would be "Can the term 'aetiology' be applied at all to the Egyptian medical materials without some distortion either of the word itself or of the evidence studied?"

THOMAS O. LAMBDIN

THOMAS GEMINUS. *Compendiosa totius anatomie delineatio*. A facsimile of the first English Edition of 1553 in the version of Nicholas Udall. With an introduction by C. D. O'Malley. London: Dawson's of Pall Mall, 1959, 39 + 200 pp. Ill. £12. 10s.

Soon after the publication of the *Fabrica* and the *Epitome*, numerous printers plagiarized Vesalius' clear, intelligible text, or Kalkar's unrivaled illustrations, or both. In 1545 already the well-known *Compendiosa totius anatomie delineatio* of the printer and engraver Thomas Geminus appeared in London. Composed of Vesalian illustrations and their descriptions, as well as the text of the *Epitome*, the work was published by Geminus at the request of King Henry VIII; he mentions Vesalius' name, he admits his plagiarism, and justifies it with the usefulness of his engravings. Indeed, the importance of the *Delineatio* lies in its copper-engraved

illustrations by Thomas Geminus, the first engravings of any artistic importance produced in England. They show details more clearly than woodcuts do. A second edition appeared in 1553, namely in the English translation by Nicholas Udall, the father of English comedy, "and certain other learned men." The engravings remained the same as those in the 1545 edition; the text of the *Epitome* was replaced by a "Treatyse of Anatomie." This edition was to be a brief guide or manual to dissection for the barber surgeons, who did not master Latin, in order to improve their poor anatomical knowledge. Economic considerations also played an important part in the English translation of 1553, for the sale of the Latin *Delineatio* of 1545 had gone very well not only in England, but also on the European continent. A third edition (second English edition) followed in 1559.

The plagiarisms of Thomas Geminus—the Latin as well as the English editions—are very rare today (*see* H. Cushing, *A Bio-Bibliography of Andreas Vesalius*. New York: Schuman, 1943, pp. 119-128). The new facsimile of the English edition of 1553 is therefore to be welcomed, for it makes this interesting book and its valuable copper-engravings available to a wide circle of physicians. O'Malley has prefaced the facsimile with an introduction which, in both form and content, is a model of medico-historical source work.

In this introduction the author traces the meagre sources of evidence about the life of the plagiarist. He proves that Geminus (his real name was Lamberd or Lambert) must have come to London about 1540 from a little village near Liège. Evidently Geminus, the engraver and printer, had been active as a surgeon until, in 1555, the College of Physicians forbade his practice of a medical profession as illegal. O'Malley agrees with Larkey (S. V. Larkey, "The Vesalian compendium of Geminus and Nicholas Udall's translation: Their relation to Vesalius, Caius, Vicary and de Mondeville." *Trans. Bibliogr. Soc. Lond.*, 1933, *13*: 367-394) that the plagiarism of Geminus was one of the most important anatomical works in England in the 16th century and that it held great value especially for the education of surgeons in England. Its influence can be traced for a century, many other plagiarisms being based upon that of Geminus. What was needed was not a translation of the *Fabrica* into English, but brief instructions in dissection,—and that was precisely what Geminus' book offered. It could, of course, contribute nothing to the advancement of anatomical knowledge. O'Malley points out that neither Udall nor the other "learned men" recognized the real value of the illustrations and the text of Vesalius' works. It is therefore not surprising that the illustrations and the preceding "Treatyse of Anatomie" often contradict each other.

The question of the origin of the "Treatyse of Anatomie" had so far not been explained satisfactorily in spite of Larkey's research. By comparison of texts, O'Malley proves convincingly that the "Treatyse" was taken and compiled, with a few exceptions, from the 1548 edition of Vicary's *Anatomie of Mans Bodie* and from translation and paraphrase of Vassaeus' *In anatomen corporis humani tabulae*. The editor also gives a table of the sources of the illustrations which almost all go back to the *Fabrica*; the allegoric title page of the book stems from Geminus himself.

If there is anthing to criticize about this welcome publication, it is only the fact that the facsimile reproduction of Geminus' plagiarism does not quite fulfill the

demands which one can make today on printing technique, even if—as perhaps was the case here—the original was bad. However, one can in no way blame the editor for this; to him we extend our gratitude for this new edition and its introduction.

GERNOT RATH

EMMET FIELD HORINE. *Biographical Sketch and Guide to the Writings of Charles Caldwell, M. D. (1772-1853)*. Brooks, Ky.: High Acres Press, 1960, viii + 155 pp., Ill., $10.00.

The facts and fancies of Charles Caldwell's life are known to us chiefly through his *Autobiography* (1855). Although its accuracy has been much questioned and many supposed facts have been disproved, it allows us to form a picture of the man who has been called by a long series of derogatory names: arrogant, quarrelsome, egotistical, belligerent, conceited, vain, bombastic, verbose, and worse. Osler opined that despite the inaccuracies in the *Autobiography*, it would be sure to survive since it was "pickled in vinegar."

Even with these failings of character, Caldwell was a man of wide interests and keen observation. Educated in Philadelphia, alternately friend and opponent of Rush, he entertained ambition for achieving professorial rank there. Disappointed in this hope, he removed to Lexington, Kentucky, to accept the Chair of the Institutes of Medicine and Clinical Practice in the medical department whose establishment at Transylvania he had himself urged. Later he became associated with the Louisville Medical Institute.

Despite rather active detours into the fields of phrenology and hypnotism, Caldwell remained on the main highroad of all regular medicine, translating works from the French and producing his own numerous articles on subjects medical and otherwise. Many of the latter were described as dogmatic, rhetorical, or hypercritical. His interest in phrenology was such that he himself wrote a book on the subject.

The author of this guide to Caldwell has been collecting his writings for the last forty years in the hope that a full length biography might follow the accomplishment of a complete collection. The publication of the volume is occasioned by the presentation of Dr. Horine's collection to the Library of the School of Medicine of the University of Louisville.

Rather than fulfill his desire for a lengthy biography, the author has contented himself with a short sketch of his subject. He makes no apology for him and recognizes his many faults. This sketch occupies the first section of the book and is followed by a lengthy Guide to the Published Writings of Charles Caldwell, totaling 209 items. By far the greater number of these are brief orations, addresses, essays, introductory remarks, or editorial comment. Of the last class of material, many items were short articles produced during the time when Caldwell was editor of *The Port Folio* in Philadelphia in 1809 and subsequently. Book reviews are included. All of the lengthier articles are annotated and are accompanied with Dr. Horine's comment. This section of the book is probably its most important element.

Because of Dr. Caldwell's interest in phrenology, Dr. Horine has included in his listing a section on books and articles on phrenology including 45 items, with comment and discussion. In the next section he has added 16 books on hypnotism, again with comment and discussion. A fifth section lists and discusses 20 biographical sketches which have previously appeared in print. An appendix gives Caldwell's own list of his published writings and translations from 1794 until 1851. An adequate index follows.

The book is the reflection of the intense interest which Dr. Horine has shown in the life and writings of Charles Caldwell. It is an attractive publication which will serve well for reference rather than for ordinary reading. It is done with a bare minimum of typographical errors and is attractively printed. The edition is limited to 300 copies of which 250 are for sale.

JOSEPH I. WARING

Medical Department, United States Army. *Surgery in World War II: Neurosurgery*, Vol. II. Eds. R. Glen Spurling and Barnes Woodhall. Washington, D. C.: Office of the Surgeon General, Dept. of the Army, 1959. xxvi + 705 pp., Ill., $7.00. [For sale by the Superintendent of Documents, Washington 25, D. C.]

This is the second volume on the history of neurological surgery in World War II. The prior one, published in 1958 and concerned with the evolution of neurosurgical policies and the management of injuries of the spinal cord and peripheral nerves, was prepared by a group of distinguished physicians who figured importantly in the actual collection of the data during World War II.

The first section of the book deals with the subject of paraplegia. While it is a tragic commentary on modern warfare that several thousand American personnel sustained wounds or injuries of sufficient magnitude to render them permanently quadriplegic or paraplegic, the remarkably good survival and rehabilitation statistics resulting from the highly organized and dedicated care rendered these unfortunate victims is indeed praiseworthy. Although details are lacking as to the immediate mortality rate from spinal wounds since war wounding tends to be multiple and therefore cannot easily be broken down into categories, it is obvious that the majority of patients suffering severe spinal injuries survived them. This may be contrasted to the experience in World War I in which 80% of the patients suffering such injuries died within the first few weeks and most of the remainder shortly thereafter. This vast improvement in the period of some 30 years between the wars must be ascribed to many causes. These include the highly organized, efficiently operating paraplegic program developed by the United States Army, highly trained personnel, a profusion of supplies and equipment, the development of paraplegic centers, and especially the great recent strides made by the medical profession in the management of these troublesome problems. Excellent chapters are devoted to the detailed analysis of newer medical techniques including pre-, intra-, and postoperative care, the management of urological complications, and the detailed aspects of rehabilitation. The success of this program can be measured in

the later follow-up report of Dr. Harry Kessler which appeared some years after the war in the *Annals of Internal Medicine*. The government had supplied a continuum of care for paraplegics under Veterans Administration facilities after the war, and Dr. Kessler was able to report that 84% of these patients, who were under 25 years of age at the time of their initial wounding, were living at the end of 10 years, and 60% of them could ultimately be returned to their homes.

A short section on the management of ruptured intervertebral discs is incorporated in the book. Its most interesting feature is the extreme frequency with which the diagnosis was made, some 2400 cases being seen among Army personnel on stateside duty in the year 1943. This is of particular interest when one remembers that the condition was not clinically recognized until sometime after the end of World War I.

The final section, on the management of peripheral nerve injuries, constitutes an extremely useful text for all physicians interested in peripheral nerve surgery. The aspects of clinical and electrical diagnosis, anatomy, surgical exposure and techniques, neurovascular syndromes, pathological correlations, postoperative care, prognosis, and rehabilitation are all considered in some detail. In addition, there is a brief but excellent section on muscle and tendon transplantation, bone fusion, and other orthopedic techniques which have become so very valuable in compensating for permanent irrecoverable nerve injury in terms of the return of the use of extremities to a functional state.

The book is well illustrated with a number of two-tone surgical technicograms, a useful appendix of statistical information, and a good index. It is considered to be an important acquisition for the library of all who are interested in the important subject matter discussed therein.

NEAL I. ARONSON

RICHARD HARRISON SHRYOCK: *National Tuberculosis Association, 1904-1954.* A Study of the Voluntary Health Movement in the United States. New York: National Tuberculosis Association, 1957. 342 pp., Ill., $3.50.

Despite the prominence and significance of the voluntary health organizations in the United States, there are few authoritative studies dealing with their origin and development. Many voluntary health agencies are relative newcomers, but there are enough "senior citizens" in the group to make possible an historical perspective. One of these is the National Tuberculosis Association whose story is now presented in a scholarly monograph. Although writing an official history, Shryock recounts the growth of the organization with the thoroughgoing objectivity that is characteristic of his work.

As the subtitle of this volume indicates, this is more than just a chronicle. The National Tuberculosis Association was the first national voluntary health agency to address itself to the control of a specific public health problem. To explain how this came about, Shryock traces the medical and social currents of thought and action that led in 1904 to the emergence of an organization to focus the fight against the Great White Plague. Shryock does not overlook the politicking and the

jockeying for position that preceded the formation of a national group which could guide and coordinate expanding activities and knowledge in the tuberculosis field. Furthermore, he analyses in detail the evolution and implementation of the principle of lay-medical cooperation, one of the most characteristic of the voluntary health agency.

Within the framework of this history are to be found many interesting facets. One of these reveals quite clearly how the anti-tuberculosis movement was only one product of fundamental forces that were shaping American life. This is evident in the relations between the anti-tuberculosis movement and proposals for the better financing and organization of medical care. How to meet the cost of medical care was a problem, and a growing one, for patients and their families. As early as 1906, discussions of health insurance were held at annual meetings of the National Tuberculosis Association. The discussions reflect the divergences of opinion that were to crystallize after 1920. The Association, per se, did not pursue the matter, but in Connecticut, as early as 1912, Employee Tuberculosis Relief Associations were formed to which employees paid dues and employers made contributions. Quite clearly, the problem of paying for medical care, which is so much to the fore today, was already in the making around the turn of the century, before the first campaign for compulsory health insurance was undertaken.

There are many other aspects on which one would wish to comment, but the limitations of a review must be taken into account. Of considerable interest, however, is the process by which a small, private group, largely representing the northeastern area of the United States, developed into a national organization with widespread service and research activities: Today, when the voluntary health agencies are in the center of public attention and various groups wrangle over fundraising, the value of the voluntary agency, and related issues, it is necessary to see how we got to this situation. Shryock's monograph is a valuable aid for this purpose and, in a broader sense, to an understanding of the evolution of the health institutions of the United States in the first half of the twentieth century.

GEORGE ROSEN

FRIEDA SANDWITH. *Surgeon Compassionate,* The Story of Dr. William Marsden. London: Peter Davies, 1960. viii + 235 pp. Ill. 21s.

Late on Christmas Eve of 1827 a young London surgeon, while shopping for last minute gifts, found a young prostitute huddled in a doorway, near death from disease and exposure. To his great dismay, at each of the large hospitals to which he urgently brought her, admission was refused because she lacked a recommendation from a governor of the institution. Her desperate need could not outweigh this rigid requirement. Spurred by her plight and that of the many unfortunates in similar straits who were left to die unattended in alleys and doorways, the surgeon, William Marsden, determined to build a "free" hospital where admission would be determined by need alone.

William Marsden is little known today as a surgeon, but his name is familiar for his philanthropies. The tiny dispensary and hospital which he founded and nur-

tured through a life-time of devotion slowly overcame its many difficulties and setbacks that would have discouraged a less dedicated person and exists today as the Royal Free Hospital. The principle of free admission has not only been maintained but has also been adopted by other London hospitals. A second project, initiated and carried to fruition by Marsden, was the founding of the Cancer Hospital, the first institution specifically devoted to the study and care of malignant disease. This has grown into the Royal Marsden group of hospitals which are importantly engaged in cancer research, education, and treatment. Both institutions now have their own medical schools which are affiliates of London University. William Marsden has left two imposing monuments to a life dedicated to human welfare.

The story of the life and achievements of Dr. Marsden has been told in the above-mentioned book. This semi-fictionalized biography was written by his great-granddaughter on information gained from a recently discovered album of press clippings and from study of the minute books of the hospitals. The author brings certain limitations to the task she has undertaken, both as to literary style and medical historical background. Nevertheless, her little book will serve to extend the knowledge concerning the career of a sincere humanitarian and public benefactor; and it will provide interesting reading, particularly for the lay public for whom it was intended.

LEO M. ZIMMERMAN

THE BULLETIN RECENTLY RECEIVED *

Lee Ash (Comp.). *Serial Publications Containing Medical Classics.* An Index to Citations in Garrison-Morton. New Haven: The Antiquarium, 1961. xxiv + 147 pp., $6.75.

Thomas Bartholin. *On the Burning of His Library and On Medical Travel.* Translated by Charles D. O'Malley. Lawrence, Kansas: The University of Kansas Libraries, 1961. viii + 101 pp., Front., Paper $2.25.

Marcel Florkin (Editor). *Lettres de Théodore Schwann.* Liège: Société Royale des Sciences de Liège, Université de Liège, 1961. 274 pp., Ill., 250 fr.

Marcel Florkin. *Naissance et déviation de la théorie cellulaire dans l'oeuvre de Théodore Schwann.* Paris: Hermann, 1961. 236 pp., Ill.

Pietro Franceschini. "Giulio Chiarugi." Reprinted from *Scientia Medica Italica,* vol. VIII, 1960, no. 3, 269-283.

John F. Fulton. *A Bibliography of the Honourable Robert Boyle,* Fellow of the Royal Society. Second ed. Oxford: Clarendon Press [Oxford University Press, New York, N. Y.], 1961. xxvi + 218 pp., Front., 50 s. [$8.00].

* The *Bulletin* reserves freedom of decision as to the publications to be listed in this section. Items received, other than those assigned for review, are ultimately incorporated into the collection of the Institute of the History of Medicine.

Morris Gorlin (Editor). *Maimonides "On Sexual Intercourse,"* (*Medical Historical Studies of Medieval Jewish Medical Works*, vol. I.) Brooklyn, N. Y.: Rambash Publishing Co., 1961. 128 pp., $10.00.

Mirko Dražen Grmek. "Medizin und Pharmazie in der ehemaligen Republik Dubrovnik." Reprinted from *Vorträge des Int. pharmaziegeschichtlichen Kongresses in Dubrovnik 1959*; Stuttgart, 1960. pp. 51-59.

Emmet Field Horine. *Daniel Drake (1785-1852)*; Pioneer Physician of the Midwest. Philadelphia: University of Pennsylvania Press, 1961. 425 pp., Ill., $6.00.

Geoffrey Keynes, Tributes on the Occasion of His Seventieth Birthday, with a bibliographical check list of his publications. Published for the Osler Club of London by Rupert Hart-Davis Ltd., 1961. 64 pp., Ill.

James Howard Means. *The Association of American Physicians.* Its First Seventy-five Years. New York: McGraw-Hill Book Co., Inc., 1961. ix + 316 pp., $10.00.

Martin Müller. *Registerband zu Sudhoffs Paracelsus-Gesamtausgabe.* (*Nova Acta Paracelsica*, Supplementum 1960.) xii + 281 pp., Front., sFr. 60. [Karger Libri AG, Arnold Böcklinstrasse 23-25, Basel 11, Switzerland.]

Otto E. Ruhmer and Arthur G. Zupko. *Some Contributions by Jews to Pharmacy*, a historical survey. Published by the Jewish Pharmaceutical Society of America in cooperation with the American Institute of the History of Pharmacy, Madison, Wisconsin, 1960. 25 pp.

Rafael Sancho de San Roman. *Catalogo de las disertaciones y memorias de la Regia Sociedad Medica de Sevilla (1736-1819)*. Salamanca, 1961. Catalogos de Escritores Medicos Españoles, Universidad de Salamanca. Fasciculo 2, 75 pp.

Ann Tovell and Bryan Gandevia. *References to Australia in British Medical Journals Prior to 1880.* Museum of Medical History, Medical Society of Victoria, 1961. 52 mimeographed pp.

Rembert Waterman. *Theodor Schwann, Leben und Werk.* Düsseldorf: Verlag L. Schwann, 1960. 364 pp., Ill., 36 DM.

Robert R. Williams. *Toward the Conquest of Beriberi.* Cambridge: Harvard University Press, 1961. xxii + 338 pp., Ill., $7.50.

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